National Engineering Design Standards – Organising Framework

Prepared for the Water Services Authority – Taumata Arowai

5 August 2026
Commercial in Confidence

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Preface

This report has been prepared for the Water Services Authority Taumata Arowai by Michael Mills, Ben Craven, Andrew Horwood, Sophie Te Whaiti and Alice Russon from MartinJenkins (Martin, Jenkins & Associates Ltd), with technical input and advice from Claire Edmondson, Matt Kneebone, and Justine Bennett at GHD.

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Key terms used in this report

Term	Meaning in this report
Performance-based regulation	Regulation that focuses on the performance or outcome that must be achieved, rather than prescribing one mandatory design, product or method.
National Engineering Design Standards (NEDS)	Mandatory performance-based requirements for water services infrastructure. NEDS set what water services infrastructure must achieve.
National Codes of Practice (Codes)	Recognised ways to comply with one or more NEDS requirements. Codes may include technical specifications, methods, processes, testing, commissioning requirements or evidence expectations.
Alternative solution	An alternative means of complying with NEDS to that provided in a Code. A person proposing an alternative solution must demonstrate its compliance with the NEDS to the satisfaction of the applicable water service provider.
Performance domain	A key area of infrastructure performance that the NEDS addresses, such as public health or resilience and recoverability.
Objective	A high-level outcome within a performance domain, that the infrastructure it applies to must achieve.
Requirement	The enforceable NEDS obligation that applies to specified infrastructure, activities or lifecycle points. Requirements translate objectives into something clear and assessable.
Functional requirement	The part of a requirement that states what the infrastructure must do to achieve the objective.
Performance requirement	The part of a requirement that provides the benchmark for deciding whether the functional requirement has been met.
Compliance pathway	A way to demonstrate that a NEDS requirement has been met. This may be through a National Code of Practice or an approved alternative solution.

Executive Summary

The purpose of this report is to inform decisions by the Water Services Authority – Taumata Arowai (the WSA) on a preferred approach to establishing the National Engineering Design Standards (NEDS) and associated Codes of Practice (Codes). It discusses and advises on:

- The legislative requirements for NEDS and Codes of Practice
- The regulatory and wider water services context that informs decisions on development and implementation of the NEDS and Codes of Practice
- The issues that NEDS and Codes of Practice are expected to address and the objectives that options will be assessed against
- The main design choices for the NEDS and Codes of Practice and options to inform their development
- The impacts and expected costs and benefits for water services of implementing the preferred option relative to two alternative options
- Matters to consider in development and implementation of the preferred option.

The Water Services Act provides for National Engineering Design Standards and National Codes of Practice

Part 3 of the Water Services Act 2021 (the Act) provides for NEDS for water services infrastructure. The policy intent is to provide for greater national consistency in the design, construction and operational performance of water services networks across New Zealand in order to ensure consistent quality and provide for cost efficiencies in the delivery of water services.

NEDS will set mandatory performance-based requirements for the design, construction and operation of water infrastructure across water supply, wastewater, and stormwater.

The Act also provides for Codes of Practice in support of NEDS. National Codes of Practice provide a compliance pathway for developers, contractors and water services providers when building or renewing water infrastructure. Like Acceptable Solutions under the Building Code, Codes of Practice will provide certainty through an accepted way to comply with the mandatory requirements and may include technical specifications, standards, and steps.

Developers, contractors, and water services providers may also propose alternative solutions, instead of following a specific Code of Practice. The alternative solutions pathway is intended to provide a means for flexibility and innovation. Infrastructure that is built or upgraded using an alternative solution must still comply with the mandatory performance-based requirements. Alternative solutions need to be approved by a water services provider.

NEDS, any associated Codes of Practice, and alternative solutions are intended to replace a patchwork of inconsistent and localised standards provided through the existing locally developed codes. The current fragmented approach creates inefficiencies, inconsistency, duplication, and uncertainty for water service providers, councils, developers, and suppliers. The current arrangement risks creating inconsistent public health, environmental, resilience, and value-for-money outcomes across the country.

The shift to a coherent national system – governing the design, construction, and performance of water supply, wastewater, and stormwater infrastructure – is intended to ensure a consistent approach to water network infrastructure across the country.

Compliance with NEDS is mandatory and administered by water services providers

All private infrastructure (built by developers or their contractors) must comply with the requirements in the NEDS before it connects to a water services provider's network or is vested in the provider's ownership. Infrastructure that is owned or operated by a water service provider must also comply with requirements in the NEDS when it is upgraded or renewed.

Water services providers will be responsible for inspecting and approving compliant infrastructure, based on new bylaw arrangements in the Local Government (Water Services) Act 2025.

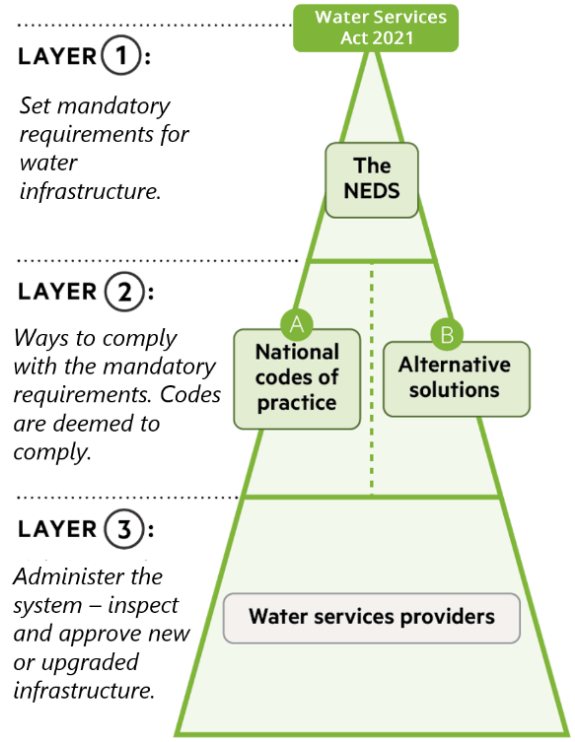
In practice, developers and contractors will use Codes of Practice or alternative solutions to demonstrate they have complied with the NEDS.

This report considers choices for establishing the NEDS

To be effective, the NEDS will need to provide a clear benchmark for the performance that infrastructure must achieve, while leaving flexibility in how that performance is delivered to enable the practicalities of local circumstances and site-specific considerations to be taken account of.

As well as being applicable to the design of infrastructure, the NEDS will also apply to the connection of infrastructure to a network; repair, upgrade, renewal, replacement, maintenance and decommissioning; and for how information about infrastructure is collected, kept and shared.

Figure 1: The foundational NEDS framework



This report focuses on four first-order choices for the design and organisation of the NEDS and the National Codes of Practice that will sit under them:

- **Commonality of performance objectives** – whether there should be a common set of performance objectives that apply across all water services infrastructure, or whether

objectives should differ across different water services and network components

- **Proportionality in application** – whether all requirements should apply equally across all water services infrastructure or whether their application should vary with, and be proportionate to, the role and importance of the infrastructure within a network
- **Prescription** – the level of detail to which requirements should be specified and the extent to which local judgment should be allowed for in their interpretation and in decisions on compliance
- **Ambition for day one** – how much of the framework should be developed into requirements and Code pathways in the first edition of the NEDS, or whether a prioritised approach should be taken to this over time.

These choices informed development and exploration of three options for the first edition of the NEDS, which differ in the integration and completeness of the framework to be initially implemented.

Preferred approach

The preferred approach for establishing the NEDS is shown in Figure 2. It would prioritise development of requirements and Codes of Practice in areas where:

- early national direction will make a material difference to improve outcomes, consistency, efficiency and confidence in the regime, and
- there are already clear requirements and a settled technical basis for the framework based on clear evidence and mature sector practice.

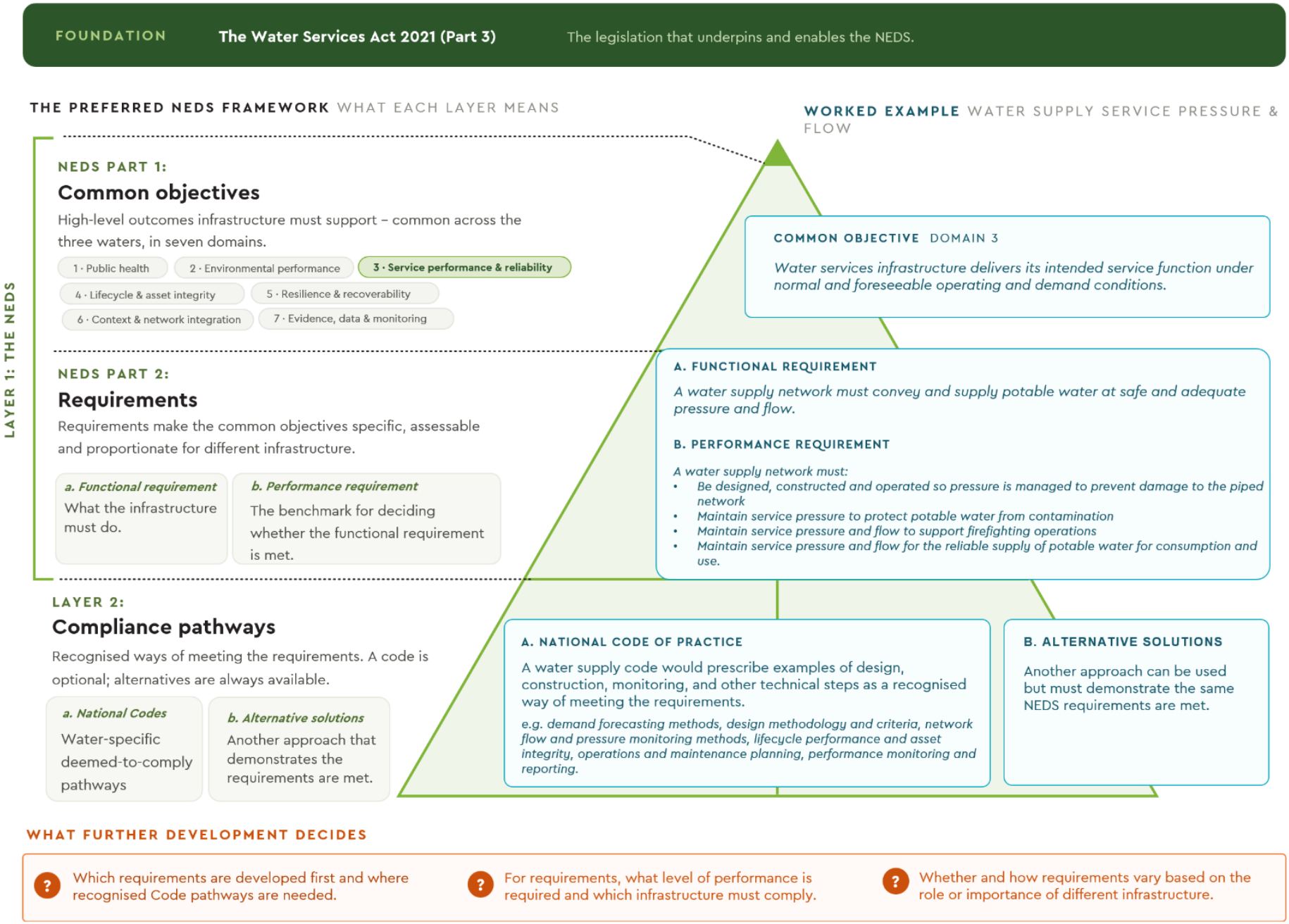
Developer-built infrastructure is likely a priority because it is high-volume, closely linked to Government priorities relating to growth, and a major area where local variation can create cost, delay, redesign and uncertainty.

Under this approach, the core elements of the framework that would be prioritised are:

- Common performance domains and objectives across all water services from day one.
- Fully developed requirements where the importance of infrastructure and value to be gained from inclusion in the framework is high.
- A prioritised set of clear, practical and usable Codes of Practice, based on water supply, wastewater and storm water infrastructure, promoting easy implementation by the sector.

This approach is intended to prioritise where impact and value of the NEDS is expected to be greatest. It will also allow requirements and Codes to be expanded over time in a way that is coherent and leads to a stable framework in the long-term.

Figure 2: The preferred approach



One performance framework would apply across water services

The NEDS would provide for common performance objectives across water supply, wastewater and stormwater, based on seven performance domains related to:

- Public health
- Environmental performance
- Service performance and reliability
- Lifecycle and asset integrity
- Resilience and recoverability
- Context and network integration
- Evidence, data and monitoring

While the objectives would be common to all water services, specification of the requirements to give effect to them would be developed to take account of differences between infrastructure, the relative importance of infrastructure components and the benefits to be gained from standardisation of performance requirements.

Requirements would apply proportionately to infrastructure components

A common performance framework does not mean every part of a water network should be expected to fully meet all requirements in exactly the same way.

The NEDS would allow requirements to reflect the role and importance of different infrastructure and the consequences of non-performance. This could affect:

- Whether a requirement applies
- The level of performance required
- The evidence or assurance needed to demonstrate compliance.

For example, infrastructure that is critical to the performance of a network or where failure could have significant consequences may face a higher performance or assurance bar than lower-consequence infrastructure.

The detailed approach for determining this variation, including whether a classification framework is used, would be developed and tested as the NEDS requirements are drafted.

Requirements and Code pathways would be developed first in priority areas

The NEDS would be developed first in areas where national direction is expected to provide the greatest benefit. The need for requirements and Code of Practice coverage would be considered together.

Potential areas would be prioritised using two questions:

- **Would early national direction make a material difference?** Priority would be higher where poor or inconsistent performance has significant consequences, or local variation creates cost, delay or uncertainty. A strong case for a recognised national Code pathway may also increase the priority of an area.
- **Can clear national requirements and, where useful, Code pathways be developed now?** The infrastructure function, performance benchmark and application need to be capable of clear definition and supported by a sufficient technical and evidence base. Where a Code pathway is justified, the technical approach also needs to be sufficiently established and repeatable to be standardised.

Areas with both a strong case for national direction and sufficient readiness would be progressed first.

Detailed development would determine the requirements and Code pathways for each priority area

For each priority area, detailed development would determine where specific requirements are needed and translate the common objectives into:

- **Functional requirements**, which state what the infrastructure must be able to do

- **Performance requirements**, which set the mandatory level of performance for relevant infrastructure and provide the benchmark for deciding whether the functional requirement has been met.

This is how the NEDS moves from common objectives to clear and assessable requirements for particular infrastructure.

It would also determine:

- How performance is measured
- Which infrastructure the requirements apply to
- What level of performance is required
- Whether performance or assurance expectations should vary based on the role or importance of infrastructure
- Whether a recognised Code pathway should be developed.

The NEDS requirements would state what performance must be achieved. A Code would provide a recognised way of meeting the requirements where a national technical pathway would reduce inconsistency, cost, delay or uncertainty and the approach can be standardised.

Codes of Practice would be organised by water service

We recommend separate Codes of Practice for water supply, wastewater and stormwater. Each Code would bring together recognised pathways for different infrastructure components and activities within that water service. Not every NEDS requirement would need Code coverage.

The priority should be to develop clear, practical and usable Codes as these will be the main interface for water professionals, developers and contractors when building, upgrading or renewing infrastructure under the new arrangements. This will help realise benefits from standardisation and promote easy implementation by the sector.

The framework would be built out progressively over time through a staged approach

The first edition would be coherent, but not exhaustive. Further requirements and Codes would be added in stages using the same prioritisation approach.

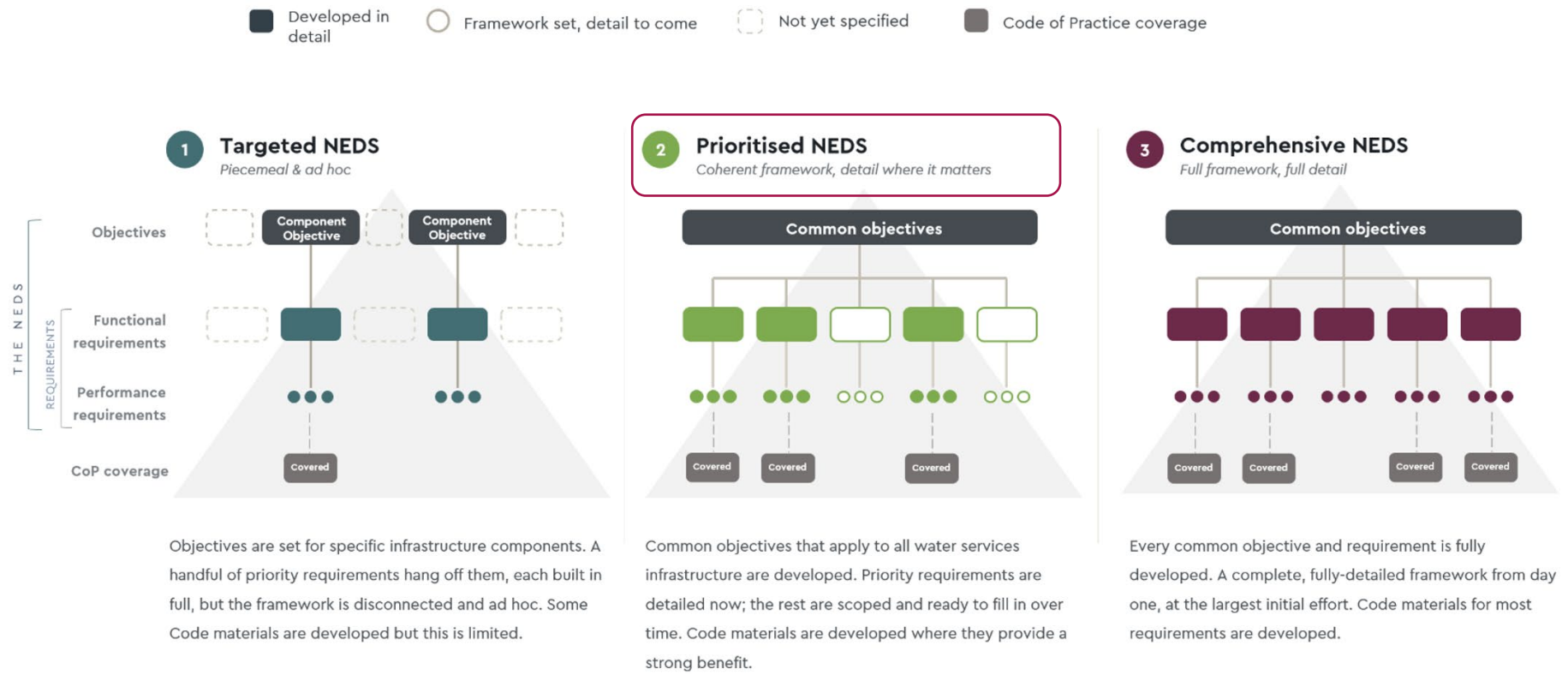
This approach establishes a coherent national performance framework from the outset, while focusing the significant technical work needed to set performance levels and develop Code pathways in priority areas first.

Other approaches considered

Two alternative approaches (targeted and comprehensive NEDS) were considered to highlight the key choices in the design of the NEDS.

- The first alternative was to specify performance objectives separately for prioritised types or components of water services infrastructure, rather than a common set of performance domains and objectives across all water services. This would enable the quick implementation of NEDS for high priority infrastructure from day one but over time would result in a patchwork of component specific arrangements rather than providing for an integrated approach to whole of network performance
- The second alternative was to implement a full suite of requirements across all water infrastructure, together with a comprehensive set of Codes from day one. It would differ from the preferred option in that it would aim to provide an all-inclusive regulatory framework with complete coverage, with no prioritisation or regard for relative importance of infrastructure and its components. Implementation of this would

Figure 3: The options considered



require a much larger programme of technical work over a significantly longer timeframe, extensive testing and sector input, including in areas where the need or technical approach may be less settled.

Figure 3 summarises the differences across the three alternatives.

Impacts and benefits of the preferred option

The implementation for a coherent set of NEDS prioritised for the importance and value of infrastructure is expected to realise substantial benefits across the lifecycle of water services infrastructure with savings compared to the status quo for capital investments and operational expenditure on water services. Based on other infrastructure sectors where standardisation has been implemented and allowed to mature, the preferred option is

expected to include efficiencies and cost savings in:

- Planning and design of infrastructure: this is the phase where the NEDS and associated Codes of Practice are most likely to reduce costs through standardisation and consistency of requirements and technical solutions. Depending on project complexity, savings could range from 10-40%
- Acquisition and build of infrastructure: significant ongoing savings are likely to be achievable of approx. 5-10% of the costs of acquisition and build, with standardisation providing for increased scale opportunities in the production, supply and procurement of infrastructure components
- Operation and maintenance of infrastructure: depending on project characteristics, savings could range from 5-20% in operational expenditure over the life of the infrastructure based on implementation of consistent and efficient maintenance regimes that would reduce occurrence of unplanned failures and optimise asset condition over its lifetime
- Renewal, upgrade and disposal of infrastructure: standardisation could deliver the largest cost and productivity benefits for renewals – for a typical renewals project savings are estimated to be around 10%.

  This is across a substantial programme of planned renewals over the next ten years.

These savings will be partially offset by the costs associated with developing, implementing and administering NEDS and associated Codes of Practice. Over time, the implementation of the preferred approach is also expected to result in substantial net benefits including more sustainable, resilient, better-quality services for communities and progressive improvements in the public health and environmental performance of water services infrastructure.

Implementation considerations

Substantial industry engagement and technical work is required to develop and implement the preferred option. It is proposed that this should involve:

- Industry consultation and engagement to test the preferred framework for development and implementation, and to provide for the prioritisation of requirements and associated Codes of Practice
- Detailed technical design work to specify the requirements for prioritised infrastructure and components
- Engagement and design on the prioritisation and development of the Codes of Practice, so that development is prioritised to the areas of greatest impact and value, and the Codes are clear, practical and usable for water professionals, developers, and contractors when building, upgrading or renewing infrastructure.

Part 1: Purpose & Context

This section provides background and scope for this work, and situates design choices and options within the wider strategic and regulatory context.

Purpose, scope and approach

Context for this work

NEDS: Mandatory performance-based requirements that set out the outcomes that infrastructure must achieve.

Codes of Practice: Recognised ways to comply with one or more NEDS requirements.

Alternative solutions: Other ways to comply with NEDS, approved by a water service provider.

Under Part 3 of the Water Services Act 2021 (the Act), the Water Services Authority – Taumata Arowai (the WSA) is responsible for developing National Engineering Design Standards (NEDS) for water services infrastructure.

NEDS are intended to replace a patchwork of inconsistent and localised standards provided through locally developed Codes. NEDS are intended to be a nationally coherent set of performance-based requirements for the design, construction, and performance of all water supply, wastewater, and stormwater infrastructure.

NEDS will apply to infrastructure built by developers or their contractors that is to connect to a provider's network, or to be vested with the provider. NEDS will also apply to all infrastructure owned and operated by water service providers when it is upgraded or renewed.

The NEDS will apply to the entire lifecycle of water services infrastructure and will include:

- performance-based requirements for the design, construction, and operational performance of water services infrastructure
- requirements for repair, upgrade, renewal, replacement, maintenance, and decommissioning, and
- requirements about how information on the design, construction, and operational performance of infrastructure should be collected, kept, and shared.

The NEDS will be supported by National Codes of Practice. National Codes of Practice will provide regulator approved ways to comply with one or more NEDS requirements. They can be used by water service providers, developers, designers, contractors and others involved in infrastructure that must meet NEDS. Codes may include detailed specifications, standards, and accepted methods.

Important scope limitation

This report does not seek to define or set specific requirements in the NEDS, or to draft the supporting Codes of Practice. These will be developed through a detailed drafting process over the coming months.

Instead, it seeks to identify the main choices for the design of the framework, and present an overall preferred approach for how the different components come together, to support policy decision-makers and engagement with the sector.

Alternative solutions may also be proposed as an alternative compliance pathway to using a Code of Practice. Alternative solutions are intended to provide a means for flexibility or innovation and must be approved by a water services provider. Infrastructure that is built or upgraded using an alternative solution must still comply with the relevant mandatory performance-based requirements in the NEDS.

Our scope and approach

This report provides advice on the options for the design of the regulatory framework for NEDS and Codes of Practice. Advice covers:

- The legislative, strategic and regulatory context for NEDS, including how NEDS fits within the wider water services system
- The problems NEDS is intended to address, the objectives it should support, and the design principles and trade-offs that should guide the framework
- The main design choices for the NEDS framework
- The options considered, the preferred option, and the expected costs, benefits, distributional impacts and implementation considerations.

The preferred option has been developed to provide a basis for the next stage of NEDS implementation. It is designed to support:

- Engagement with the sector, by giving stakeholders a framework to consider and comment on choices for design
- Further WSA advice and decision-making, by identifying the main choices to be resolved before detailed requirements and Codes are drafted.

We worked closely with the WSA

This advice was produced over 12 weeks across April-June 2026. Given the tight timeframes, we applied a sprint-based approach to develop this advice, with the MartinJenkins and GHD teams working closely together to develop advice and to test it through with technical and subject matter experts convened by the WSA.

Three main workshops, each three weeks apart, covered the following:

1. **Understanding the current state and defining the analytical framework**

   This workshop was focused on testing the problem definition and defining the objectives and criteria to guide the design of the new system. It also tested early design choices.

2. **Testing the NEDS framework and proposed performance domains**

   This workshop presented options for the NEDS and the preferred approach, and the proposed mix of performance domains that the NEDS should cover.

3. **Options for the role and structure of the Codes of Practice**

   This workshop tested the options for the scope and structure of Codes of Practice, and priorities for development. It also considered infrastructure classification.

As this work was intended to provide advice to support the WSA's further engagement with the sector on the proposals, engagement with sector representatives outside of these workshops was not within our scope.

We learnt from other jurisdictions and regimes

To develop this advice, we also looked to see what we could learn from other jurisdictions and other regimes, including internationally. The key insights are:

- While performance-based regulation is relatively mature and well understood, with many examples having been implemented, reviewed and improved over time, it is novel to apply this approach to water services infrastructure. Looking internationally, other countries have typically adopted prescriptive and localised regulatory approaches that are not performance-based.
- The Building Code provides a mature domestic example of the overall performance-based framework, with many comparisons. As this model is well understood domestically, it provides many parallels to help understand and develop thinking for the WSA.

- There are important differences between the building and water sectors, with water taking a more network-based approach and often with an important role for engineering judgement; while the Building Code model provides useful comparisons, it cannot be simply lifted across.

There are choices for the WSA

Throughout this work, we have identified and considered a range of key design choices at different levels within the framework.

While we have identified an overall approach for bringing these together, there is optionality which the WSA can test with the sector and with decision makers. As a result, the final framework may differ from what is put forward in this report.

Learning from New Zealand's building regime

New Zealand's building regime provides a useful domestic reference point for NEDS. As a mature performance-based regulatory framework, it operates through a layered hierarchy (see Figure 4), where:

- the Building Act sets the legal framework and powers
- the Building Code sets mandatory performance requirements, and
- Acceptable Solutions and Verification Methods provide recognised 'deemed-to-comply' pathways, and Alternative Solutions are allowed where they can demonstrate the same performance requirements.

The building regime is a useful reference to demonstrate how performance-based frameworks can:

- set clear outcomes without prescribing methods
- enable innovation through alternative solutions
- provide recognised compliance pathways to support consistency, and
- use classifications to ensure requirements are proportionate to consequences.

We have drawn upon these features to shape the proposed NEDS framework, including the layered structure, deemed-to-comply logic, and the proposed classification approach for water infrastructure.

While the building regime provides a useful framework to consider, it cannot be simply 'lifted and shifted' to fit to the water services context. This is because water infrastructure takes a network-based approach, and there is often an important role for engineering judgement due to local site conditions.

What this means for NEDS

The building regime provides a strong conceptual foundation for NEDS, particularly in its layered hierarchy and use of classification. The NEDS framework, however, will need to reflect the distinct characteristics of water services infrastructure, including its networked, locally variable, and long-lived nature.

The WSA will also need to acknowledge, and consider, where overlaps occur between the existing building regime and the future NEDS framework.

Strategic and regulatory context

This section sets out the strategic and regulatory context within which decisions on the design of the NEDS and Codes of Practice will be taken.

This includes wider reforms for the Water Sector, the legislative basis and role of NEDS and Codes of Practice within the new system, and how the NEDS fit alongside the WSA's wider regulatory toolkit.

It is imperative that all New Zealanders have access to safe, affordable and reliable drinking water, wastewater and stormwater, and that any adverse impacts of these services on the environment are mitigated.

Drinking water, wastewater and stormwater services are generally supplied and managed by around 40 local authority owned water service providers including a small number of large multi council CCOs. Other registered drinking water suppliers include government suppliers[1] and community and private suppliers.[2]

- In 2024, 83% of New Zealanders received their drinking water from a registered drinking water supplier.
- In 2025, there were 334 publicly owned wastewater treatment plants across New Zealand, which are owned and/or operated by councils, their council-controlled organisations, or by Crown agencies like the Department of Conservation and the New Zealand Defence Force.[3] All 67 territorial authorities operate one or more wastewater treatment plants.
- Stormwater services are provided along similar lines – regional councils are the primary regulators for managing stormwater, with additional roles for the WSA, New Zealand Transport Agency – Waka Kotahi, Earth Sciences New Zealand, KiwiRail, and local authorities.

Strategic context of the water services sector

This section outlines the broader strategic context for the water services sector, including the key challenges driving reform and the current policy framework established through *Local Water Done Well*. It highlights the scale of investment required and the structural changes underway to improve the delivery, sustainability, and oversight of water services.

The water sector is undergoing substantial reform

The water services sector is in the midst of substantial reform in response to a range of long-standing challenges. These include ageing infrastructure, historic underinvestment, population growth, climate change, increasing exposure to natural hazards and major failures including the Havelock North water

[1] The Ministry of Education, Department of Conservation, Department of Corrections, and New Zealand Defence Force.

[2] Water Services Authority Taumata Arowai, "Drinking water regulation report 2024", June 2025, https://www.taumataarowai.govt.nz/assets/Uploads/Network-Performance/Drinking-Water-Regulation-Report-2024.pdf

[3] Water Services Authority Taumata Arowai, "Public register of wastewater networks", no date, https://hinekorako.taumataarowai.govt.nz/publicregister/wastewater/.

contamination event and the failure of the Wellington Moa Point wastewater treatment plant.

These challenges are reflected in the scale of investment required in water services infrastructure. The Department of Internal Affairs (DIA) has estimated that between $120 billion and $185 billion will be required over the next 30 years to address historic underinvestment and to upgrade infrastructure to meet minimum acceptable health and environmental standards.

Recent Water Services Delivery Plans (WSDPs) indicate that approximately $49 billion of capital investment is forecast over the next decade, with a significant proportion allocated to asset renewals.

Local Water Done Well provides the broader policy and regulatory framework for water services

The Government's water reform programme, *Local Water Done Well* (LWDW), recognises the importance of local decision making and flexibility for communities and councils to determine how their water services will be delivered. There are three key components of LWDW:

- fit-for-purpose service delivery models and financing tools for local authorities and their water service providers to use
- obligations on local authorities for the provision of water services to their communities, and to ensure that these services are financially sustainable and compliant with regulatory requirements, and
- greater central government oversight, economic and quality regulation.

LWDW required all territorial authorities to submit a WSDP to the Department of Internal Affairs by September 2025, as provided for under the Local Government (Water Services Preliminary Arrangements) Act 2024. These plans set out how water services would be delivered in the future, including whether through in-house business units, single-council council-controlled organisations (CCOs), or multi-council CCOs.

Councils have now established the initial delivery models for water services, with most targeting a 1 July 2026 "go-live" date for new arrangements, and others transitioning in the following year.

From 1 July 2027, at least 44 territorial authorities are expected to deliver water services through council-controlled organisations (either singly or jointly owned), with up to 23 councils continuing to deliver services through in-house models. This means that approximately 76% of New Zealand's population will receive water services through a CCO model.

Together, these changes establish the initial institutional and regulatory framework for water services, reflecting the Government's Local Water Done Well reforms and associated legislation enacted between 2024 and 2025. Over time, it is expected that the legislative and regulatory framework will provide incentives for further consolidation of water services.

This broader reform context is important. The NEDS is intended to support more consistent, efficient, and scalable delivery of water services infrastructure within this still dispersed but evolving system. It is also expected to result in more consistent requirements for developers, across water service providers, in building infrastructure for connection and vesting to a public network.

The NEDS is established in legislation as a performance-based framework

The Water Services Act 2021 (the Act) establishes National Engineering Design Standards (NEDS) as a regulatory tool to support national consistency in the design, construction and operational performance of water services networks.

The purpose of NEDS is set out in section 97B and includes:

- promoting the efficient and financially sustainable operation of networks
- improving reliability and resilience
- protecting public health and safety, and
- contributing to the continuous improvement of water services.

NEDS applies to water services networks

The Act defines the broad scope of NEDS through the concept of a water services network.

For the purposes of NEDS, the Act defines a water services network as comprising one or more of the following:

- a water supply network
- a wastewater network, or
- a stormwater network.

The detailed statutory definitions of these networks are contained in the Local Government (Water Services) Act 2025. The NEDS are focused on infrastructure that forms part of a water services network, is proposed to be transferred to a WSP, or is being connected to a network.

The reference to "one or more" network types in the Act provides flexibility in how NEDS apply across the three waters. Individual requirements may apply to the water services infrastructure in one, two or all three network types (as long as this is specified). The Act also does not expressly require the same breadth or level of requirements to be developed for all three waters at the same time, which may provide flexibility to phase development by water service.

What counts as a water services network?

Water Services Network is defined for the purposes of NEDS in the Local Government (Water Services) Act 2025. It is defined as one or more of the following three networks in a territorial authority's district of a water service provider's service area.

1. **Water supply (drinking water) network:** The system used to supply drinking water, including source, treatment, storage and distribution to consumers.
2. **Wastewater network:** The infrastructure and processes used to collect, transport, treat and discharge wastewater.
3. **Stormwater network:** The infrastructure and processes used to collect, drain, store, treat or discharge stormwater in urban areas, including both built and natural systems such as pipes, channels, and overland flow paths.

Privately owned infrastructure that never connects to, or forms part of, one of these networks sits outside the definition, and therefore outside the scope of NEDS.

The legislation establishes a performance-based approach

NEDS must regulate outcomes rather than prescribe solutions

The Act requires NEDS to contain performance-based requirements for the design, construction and operational performance of water services infrastructure (s97D(1)(a)).

Performance-based regulation focuses on what infrastructure must achieve rather than prescribing how outcomes must be achieved. This allows flexibility in design approaches while supporting innovation and adaptation over time.

Requirements should remain assessable

The benefits of a performance-based approach depend on requirements being sufficiently clear to be consistently interpreted and assessed across multiple water service providers.

What is a performance requirement?

In a performance-based regime, a requirement needs to clearly link the outcome being protected to what must be demonstrated in practice to show that outcome has been achieved. A prescriptive requirement would specify how an asset must be built. A performance-based requirement specifies the outcome that must be achieved.

A performance-based requirement therefore usually contains:

- **Objective:** the high-level outcome that infrastructure must achieve.
- **Application of the objective:** This explains what the objective means in practice, including:
  - What the infrastructure must do
  - How that is defined in a way that can be assessed

This is particularly important for alternative solutions and avoiding Codes becoming the only practical compliance pathway.

Requirements that are too general can create uncertainty in their interpretation and assessment. Requirements that are overly detailed can undermine flexibility to address specific local circumstances or to make beneficial improvements and innovations to how water services are delivered.

The legislation establishes a layered regulatory framework

The legislative framework can be understood as a layered regime:

1. The Act establishes the legal framework and powers.
2. NEDS establish mandatory performance requirements for water services infrastructure.
3. Codes of Practice provide standard means for achieving and demonstrating compliance with mandatory performance requirements.

This structure is similar to New Zealand's building regulatory regime and is illustrated in Figure 4 below.

Codes of Practice support compliance

The Act enables the WSA to develop Codes of Practice as a means of complying with one or more NEDS requirements through a recognised pathway (s97I(1)).

The Act expressly contemplates that Codes may contain detailed technical specifications, standards and methodologies (s97I(3)).

Where a Code of Practice is followed, compliance with the relevant NEDS requirement must be treated as having been achieved (s97I(2)(b)).

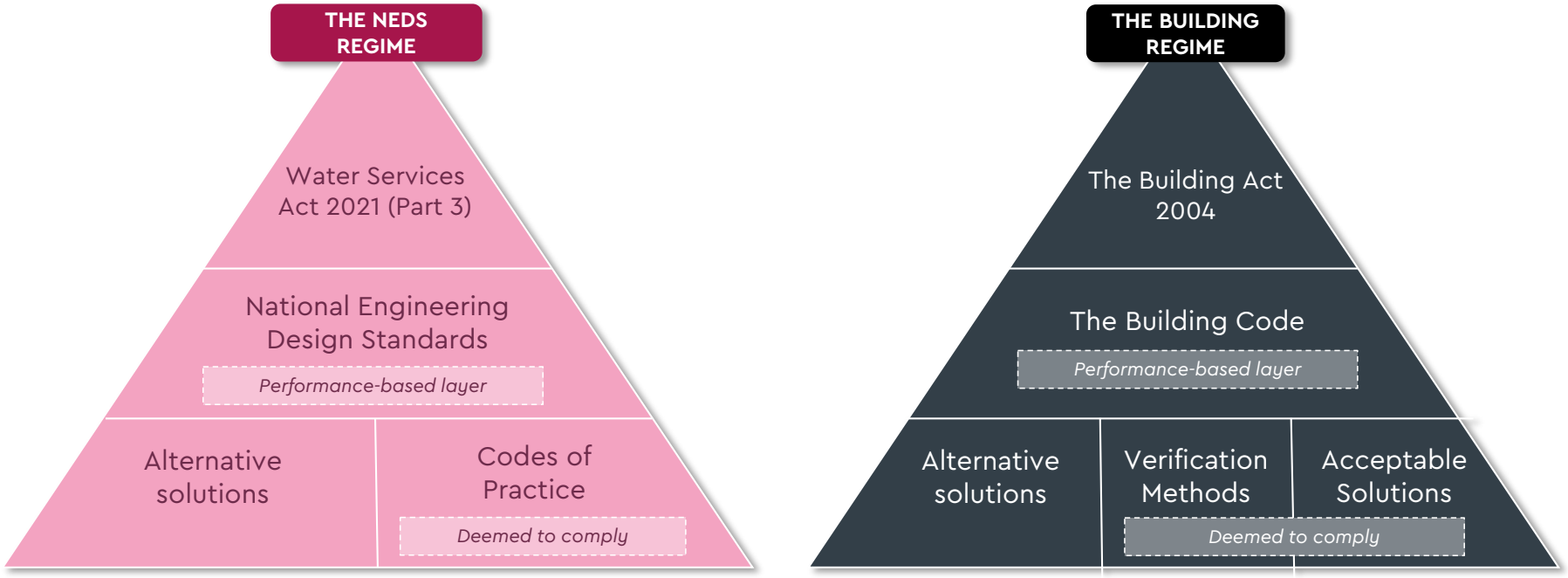
Codes therefore play an important role in specifying compliant solutions that can be applied consistently and reliably in practice, reducing uncertainty and compliance costs for regulated parties.

Alternative solutions are allowed

The regime also allows for alternatives to National Codes (alternative solutions), provided compliance with the relevant NEDS requirements can be demonstrated (s97P).

This is a key feature of a performance-based regime. It allows recognised compliance pathways to be provided through Codes of Practice while preserving flexibility for alternative approaches where they can demonstrate that the relevant requirements have been achieved.

Figure 4: The foundational structure of the NEDS regime



The legislation establishes the minimum matters NEDS must address

NEDS must contain requirements across the infrastructure lifecycle

Section 97D requires NEDS to contain requirements relating to:

- the design, construction and operational performance of water services infrastructure (s97D(1)(a))
- connections to water services networks (s97D(1)(b))
- repair, upgrade, renewal, replacement, maintenance and decommissioning of infrastructure (s97D(1)(c)), and
- the collection, retention and sharing of infrastructure information (s97D(1)(d)).

NEDS must clearly identify where requirements apply

NEDS must specify the type of water services network to which requirements apply (s97D(4)(a)).

Where Codes of Practice are developed, they must similarly identify the requirements and network types to which they apply (s97I(4)(a)–(b)).

Together, these provisions establish the minimum legislative scope that NEDS must cover.

The legislation provides flexibility in how NEDS is implemented

The Act provides for a range of other tools

In addition to setting mandatory requirements, the Act provides a number of tools that may be used in designing the regime.

These include the ability to:

- require specified methods for determining compliance (s97D(3))
- apply requirements to types or classes of infrastructure (s97D(4)(b))
- vary requirements between regions or districts where local physical conditions affect performance (s97(5)), and
- develop Codes of Practice (s97i), which may also apply to types of infrastructure or different regions or districts (97(I)(4)(c-d)).

The legislation sets the parameters for the design choices

The Act establishes the purpose, scope and minimum requirements for NEDS. It also provides a range of tools that may be used.

Beyond these parameters, the legislation leaves considerable discretion as to how the regime should operate in practice. Many design choices are not settled by legislation, including:

- Whether there should be a common set of performance requirements and objectives that apply to all water services infrastructure, or whether these should be specific to and differ across water services and network components
- Whether requirements should apply equally across all water services infrastructure or whether their application should vary with and be proportionate to the role and importance of particular infrastructure within the network
- How precisely requirements should be specified, and how much local judgment should be allowed for in their interpretation and assessments of compliance
- How much of the potential framework should be developed into requirements and Code pathways in the first edition.

Part 4 of this report focuses on these design choices and the implications they have for the design and establishment of NEDS.

The NEDS framework as provided for in law has evolved from earlier policy proposals

The framework in the Water Services Act that sets requirements for the NEDS and Codes of Practice is substantially different from earlier policy approaches developed by the National Transition Unit (NTU) of DIA under the previous Three Waters programme. The NTU approach focused on consolidating existing council engineering codes of practice into a single national standard, drawing on the 'best' elements of local approaches. The NTU's work was driven by the policy decision to reorganise council water services into four new and independent water service entities. Importantly, it was not a performance-based framework.

By contrast, the NEDS framework, as set out in the Act, requires the WSA to implement a performance-based model, supported by Codes of Practice, rather than a single prescriptive design manual. Unlike the NTU's voluntary standard, compliance with the requirements in the NEDS will be mandatory. This reflects a move towards nationally consistent performance expectations, while retaining flexibility in how

those expectations are met across multiple council owned providers.

The NTU's work will be a valuable input to development of the NEDS framework. It will provide a consolidation of the best practice of existing local approaches and has had extensive input from practitioners. However, further work is necessary to develop a performance-based NEDS framework that meets the new statutory requirements.

The NEDS will be one part of the wider water services regulatory system

The NEDS will sit within a broader water services regulatory system, as shown in Figure 5 below. More detailed descriptions of related actors, standards and tools are included in Appendix 2.

Different actors have different roles in the system

- **The WSA** sets national standards, including the NEDS and National Codes of Practice, and provides national-level oversight of compliance across the water services system.
- **Water service providers** administer the NEDS by inspecting and approving infrastructure built by private developers and contractors, ensuring that it complies with the requirements in the NEDS before it connects to, or vests in, their network. They must also ensure that upgrades or renewals of infrastructure they operate complies with the requirements in the NEDS.
- **Territorial authorities** provide local governance, including ownership of water

Table 1: The relationship between NEDS and other regulatory tools in the system

Tool	What it covers	Relationship to NEDS
Drinking Water Standards, Quality Assurance Rules and Acceptable Solutions	*Drinking water quality, safety, assurance requirements and recognised ways for some suppliers to comply.*	NEDS should support safe drinking water through infrastructure performance, but not duplicate drinking water quality requirements or drinking water compliance pathways.
Wastewater environmental performance standards and future stormwater environmental performance standards	*Environmental performance, including discharges, overflows and bypasses.*	NEDS should support environmental outcomes through infrastructure performance, but not duplicate discharge standards or consent limits.
Resource management and planning system	*Land use, development, resource consents and environmental effects.*	NEDS should interface with this system but remain focused on water services infrastructure performance.
Infrastructure Design Solutions	*Streamlined pathways for particular wastewater or stormwater infrastructure, especially treatment-related solutions.*	NEDS needs clear boundaries with IDS, particularly where treatment infrastructure and network infrastructure interact.
Water services bylaws	*Processes for inspection, approval, connection and vesting of water services infrastructure.*	NEDS sets the infrastructure performance requirements that these processes apply.
Economic regulation	*Cost-effectiveness, efficiency and consumer outcomes for water services.*	NEDS may affect infrastructure cost and long-term value but does not regulate economic performance.

service providers and making water services bylaws. Those bylaws must give effect to the NEDS.

- **Regional councils** administer resource management functions, including consenting for discharges to land and water.
- **MCERT** provides legislative stewardship and monitors the WSA.
- **The Commerce Commission** provides economic regulation, focused on cost-effective and efficient services for consumers.
- **Developers and contractors** design, build, renew and upgrade infrastructure. Infrastructure that connects to or vests in a water services provider's network must comply with the relevant NEDS requirements

The system also uses different regulatory tools

- **Drinking Water Standards and Quality Assurance Rules** set requirements for drinking water quality and assurance.
- **Wastewater and stormwater environmental performance standards** set requirements for environmental performance, including discharges to land and water.
- **Infrastructure Design Solutions** may provide streamlined consenting pathways for particular infrastructure, primarily treatment-related infrastructure.
- **Water services bylaws** set the processes for inspection, approval, connection and vesting of private infrastructure to public networks.
- **Economic regulation** focuses on whether water services infrastructure and services are cost-effective and efficient for consumers.

The relationships between these tools and NEDS are summarised in Table 1.

NEDS has a distinct role within the system

The NEDS focuses on the performance of water services network infrastructure. In plain terms, it is focused on the infrastructure that makes the network work. It sets performance-based requirements which apply to pipes, pumps and other assets when they are designed, built and maintained. These requirements are set to ensure that infrastructure can function safely, reliably and efficiently and in accordance with other regulatory requirements.

The NEDS and associated Codes will set requirements for the entire lifecycle of water service infrastructure, encompassing its design, construction, operation, maintenance, renewal, upgrade and decommissioning. This includes infrastructure that forms part of a water services network, is proposed to connect to a network, or is proposed to vest in a water service provider.

This boundary is important. NEDS should support wider water services outcomes but not duplicate the regimes that set drinking water quality limits, environmental discharge limits, consent conditions, economic regulation requirements or broader asset management obligations. If those roles are blurred, the framework risks creating duplication and confusion.

At the same time, NEDS should not be designed in isolation. Infrastructure performance is one of the ways wider water services outcomes are achieved. Water supply network integrity can support drinking water safety. Wastewater network capacity and containment can reduce overflows.

The design task is therefore to define NEDS as the infrastructure performance layer within the broader system. It should set clear requirements for water services network infrastructure, while Codes of Practice and alternative solutions provide pathways for achieving compliance with those requirements.

Figure 5: Water services infrastructure system map

A How the NEDS *fit in the water infrastructure system*

Water Services Authority
Taumata Arowai

WHAT THIS OVERVIEW SHOWS

The National Engineering Design Standards (NEDS) are a new national regulatory framework under the Water Services Act 2021 that is being developed by the water services authority. We will seek input from councils, providers, developers, and technical experts.

This document identifies how the NEDS framework integrates with other national standards in the Water Services Act 2021 and how the sector will be involved.

The central diagram shows - in the green shaded box - what is in scope of the NEDS and the national codes of practice. Anything outside of the box is not in scope but interacts with the NEDS to ensure the system is deliverying fit-for-purpose water services.

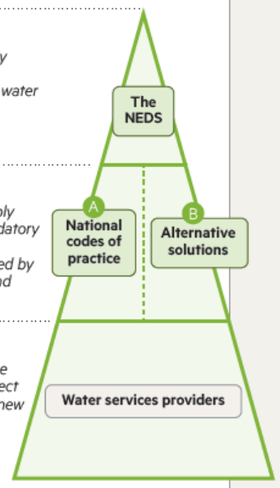
A The NEDS framework in a nutshell

The NEDS framework consists three core layers:

LAYER 1:
Set mandatory performance standards for water infrastructure

LAYER 2:
Ways to comply with the mandatory performance standards, used by developers and contractors

LAYER 3:
Administer the system - inspect and approve new or upgraded infrastructure



LEGEND

- The NEDS
- Drinking water
- Stormwater
- Wastewater
- Other system standards and tools
- Scenarios in system

B What the NEDS looks like in practice

The water system

The **Water Services Authority** sets national standards across all water services infrastructure

The NEDS

THE SCOPE OF THE NEDS & NATIONAL CODES OF PRACTICE

Current proposals relating to the NEDS relate to water services infrastructure inside this green shaded area, for example, pipes, manholes, and pump stations. At this stage, the NEDS will not apply to treatment plants.

1 RENEWAL OR UPGRADE OF EXISTING INFRASTRUCTURE

Upgrade or renewal of existing water infrastructure owned by water services providers must comply with mandatory performance requirements set by the NEDS (for example, replacing pipes underneath a road).

Developers and contractors use the national codes of practice or an alternative solution to build infrastructure that is compliant. Water services providers must approve infrastructure as compliant before it connects or vests in their ownership.

Water services bylaws

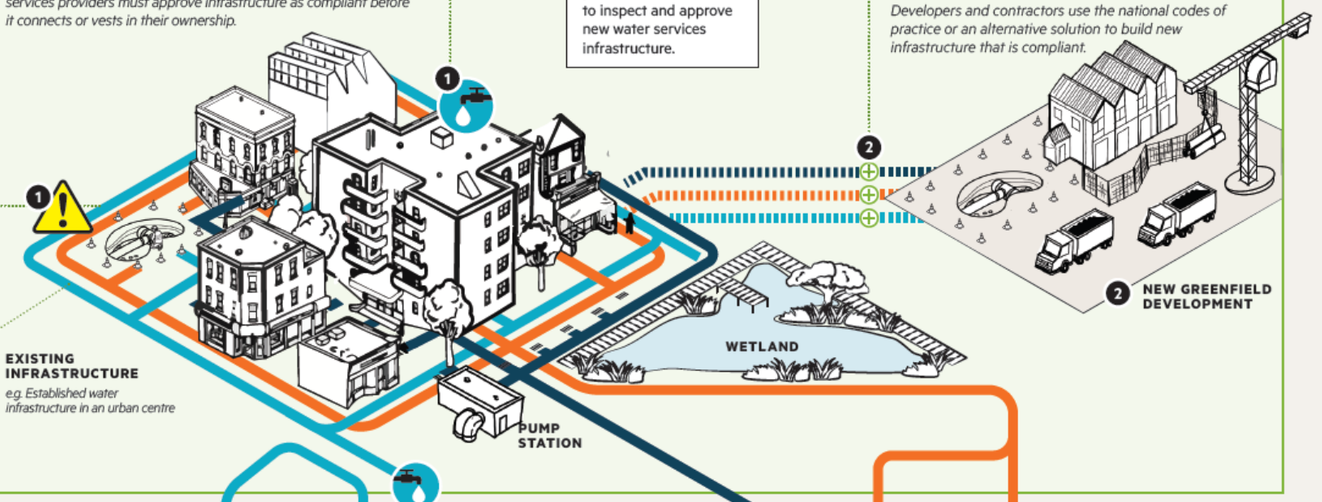
Territorial authorities make water services bylaws that set the process water services providers must follow to inspect and approve new water services infrastructure.

2 CONNECT OR VEST NEW WATER INFRASTRUCTURE

All new water services infrastructure built by developers or contractors (for example, greenfield or brownfield developments) must comply with mandatory performance requirements set by the NEDS.

Water services providers must approve infrastructure as compliant before it connects or vests in their ownership.

Developers and contractors use the national codes of practice or an alternative solution to build new infrastructure that is compliant.



Drinking Water Standards & Quality Assurance Rules

These set requirements for the quality of water that is used for drinking, cooking, washing dishes, or brushing our teeth.

RAW WATER SOURCE / RESERVOIR

DRINKING WATER TREATMENT PLANT

Wastewater & Stormwater Environmental Performance Standards

Wastewater and stormwater standards set requirements for discharges from these networks or plants to the environment.

DISCHARGES TO WATER, LAND ETC.,

WASTEWATER TREATMENT PLANT
e.g. a small rural modular wastewater treatment plant

Infrastructure Design Solutions

Yet to be developed: Infrastructure design solutions provide streamlined consenting pathways and primarily apply to wastewater treatment plants.

Ministry of Cities, Environment, Regions and Transport (MCERT) *provides stewardship of legislation and monitors the authority.*

Commerce Commission *ensures infrastructure and services are cost-effective and efficient for consumers.*

C Key organisations

WATER SERVICES AUTHORITY *sets the standards*

The Authority set the NEDS and national codes of practice - these are one of a range of new national standards the authority is responsible for. The Authority also provides national-level oversight of compliance across the water services system.

WATER SERVICES PROVIDERS *apply the standards to infrastructure*

Water services providers will inspect and approve infrastructure to ensure it complies with the NEDS. Infrastructure cannot connect to their networks or will not vest in their ownership until it is approved.

TERRITORIAL AUTHORITIES *provide local governance (ownership & bylaws)*

Territorial authorities own the water services providers, and set the bylaws for inspection and approval of water services infrastructure. These bylaws must give effect to the NEDS.

DEVELOPERS / CONTRACTORS *build the infrastructure*

Developers and contractors design and build new infrastructure, including greenfield and brownfield development, and maintenance / renewals. All new infrastructure must comply with the NEDS, where applicable. They will use the codes of practice.

REGIONAL COUNCILS *administer resource management systems*

Regional councils administer the resource management functions and water infrastructure will still require resource consent as well as be compliant with the NEDS.

The NEDS are important to wider strategic goals

This section outlines how the NEDS aligns with the Government's wider strategic priorities, particularly those focused on enabling growth and improving infrastructure affordability. It highlights the key programmes and reforms that the NEDS is intended to support, and how national standardisation of water infrastructure design is expected to contribute to more efficient and timely delivery of infrastructure in support of growth.

Growth and infrastructure affordability are key focuses

The introduction of NEDS is also more broadly linked to several other growth-related programmes, which aim to support infrastructure growth while supporting affordability and reducing the cost.

Going for Growth (Infrastructure for Growth)

Going for Growth is the government's economic development strategy. It prioritises faster, more reliable delivery of infrastructure, including water infrastructure. There is a concern that infrastructure capacity is currently constraining growth, which blocks new connections and network limitations affect development.

NEDS is intended to support this strategy by removing the inconsistent local water standards that may delay infrastructure delivery. The NEDS should enable water services infrastructure to be planned and built more quickly to enable economic and urban growth.

Going for Housing Growth

The Going for Housing Growth programme aims to enable more homes to be built. It prioritises freeing up land for urban development and improving infrastructure funding and financing.

NEDS would support increased housing delivery by providing nationally consistent water infrastructure requirements. This may reduce redesign, uncertainty and delays when connecting new housing developments to water services infrastructure networks.

Development levies

Development levies are expected to replace development contributions and will be a key tool for funding infrastructure (including water services infrastructure).

By standardising water infrastructure design and performance expectations, NEDS should support more consistent and efficient approaches to and regulation of development levy funding across local authorities.

Rates capping

Rates capping is a government proposal to limit rates increases and focus councils on cost-effective delivery of core business, which includes delivering water services.

In a constrained funding environment, NEDS can support more cost-effective delivery of water infrastructure by reducing duplication, bespoke standards, and inefficiencies across councils and providers.

National Infrastructure Plan

The Infrastructure Commission's *National Infrastructure Plan* (NIP) states that after being one of the lowest spending countries from 1980-1995, New Zealand's investment in water is now among the highest in the OECD, and much higher than our comparative countries.

However, its analysis found that

- New Zealand spends a high proportion of our GDP on infrastructure (5.8% annually) but is in the bottom 10% for investment

efficiency in infrastructure, meaning we get little "bang for buck", [4] and

- New Zealand ranks fourth to last for asset management in the OECD, as maintenance and renewal activities get routinely deferred in favour of other spend.[5]

In June 2026, the Government formally responded to the NIP by identifying significant challenges in New Zealand's infrastructure system, including high costs, low investment efficiency, fragmented planning, and weak asset management. The response sets a direction for improving system-wide performance through better coordination, stronger planning frameworks, and more consistent national approaches.

The Government's response formally agrees to all 16 of the Infrastructure Commission's NIP recommendations, with three agreements in-principle with further work to be done.

The NIP highlights the need for greater consistency, improved efficiency, and better asset management across infrastructure systems. The NEDS should contribute to these objectives by reducing fragmentation in engineering standards, supporting more consistent design approaches, and enabling more efficient delivery of water infrastructure. It is expected that the introduction of NEDS would support the following NIP recommendations:

- Recommendation 12 – Improve water infrastructure pricing and provision in cities, including allowing entities to use their balance sheet capacity to finance infrastructure growth, as well as funding asset renewals and improvements in water quality.
- Recommendation 24 – Improve spatial planning through better information on infrastructure capacity and costs to service growth, including by:
  - Requiring water entities to publish geo-spatial information on water asset condition, capacity for growth in existing water networks and capacity for growth due to planned network upgrades.
  - Developing a common approach to measuring the condition and capacity of water infrastructure assets.
- Recommendation 41 – Improve infrastructure performance reporting and insight by assembling and analysing infrastructure performance across:
  - Projects: How individual assets perform in delivery and operation.
  - Networks: how infrastructure performs as a network.
  - Systems: how networks perform as an integrated system.

[4] New Zealand Infrastructure Commission, Te Waihanga, "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026", 2026, https://media.umbraco.io/te-waihanga-30-year-strategy/zsunnlry/national-infrastructure-plan-03032026.pdf

[5] New Zealand Government, "Government Response to the National Infrastructure Plan 2026", June 2026, https://www.beehive.govt.nz/sites/default/files/2026-06/Government%20Response%20to%20the%20National%20Infrastructure%20Plan.pdf

The planning and natural environment system is also undergoing reform

The planning and natural environment system is also undergoing reform. The Government has introduced two Bills to replace the Resource Management Act 1991 with a new planning and environmental management system. The proposed system includes regional spatial plans that set the long-term direction for a region's growth and infrastructure, and natural environment and land-use plans that must implement the regional spatial plan and national instruments.

This is relevant to NEDS because the planning system will influence where and when development and infrastructure are needed. NEDS has a different role: it focuses on how water services network infrastructure must perform once it is designed, built, connected, renewed or upgraded.

This distinction matters because planning instruments and infrastructure standards already interact in practice. Current local Codes of Practice are often integrated into district plans or given effect through resource management plans or local bylaws, as shown in the breakout box on the right. As local Codes are replaced or displaced by NEDS and National Codes of Practice, those interfaces will need to be clear.

The NIP identifies opportunity for "better coordination between spatial planning, consenting, and strategic water infrastructure planning could help to deliver the right-sized projects at the right times."[6]

The intent of the planning reform is therefore complementary to the NEDS, with both seeking to reduce complexity and improve consistency. In this context, the NEDS supports planning reform by providing clear, nationally consistent technical baselines, which can help reduce consenting complexity and enable more predictable and timely approvals for water infrastructure.

Example: Wellington City's *Water Services Bylaw*

As detailed in the Wellington City Council's Code of Practice for Land Development (2025), Wellington Water publishes the Regional Standard for Water Services to ensure a consistent method of design and implementation of water assets across the Wellington region. Wellington City Council's Water Services Bylaw requires that "all connections, installations, maintenance, repair works, and any other work on or around public water services infrastructure to be in accordance with the Standard" or meet the Council's basic requirements via an alternative solution.[1]

Some parts of these local codes reflect place-based conditions, such as frost risk, ground conditions, or environmental constraints that effect how infrastructure performs in a particular area.

[6] "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

Recognising and upholding Māori rights and interests in water

This section sets out Māori rights and interests in water, and how these apply to the development and implementation of NEDS and Codes of Practice.

A more detailed analysis is appended to this report in Appendix 5.

Māori rights around water are grounded in:

- Te Tiriti o Waitangi / The Treaty of Waitangi and its principles
- Treaty settlement legislation and deeds of settlement
- Relevant legislation including the Water Services Authority—Taumata Arowai Act 2020, local government legislation, and Marine and Coastal Area (Takutai Moana) Act 2011, and
- Local arrangements between iwi/Māori and local government that shape how these rights are recognised in practice.

As a Crown entity, the WSA has its own specific obligations. These come from the law that established it and from its role as a decision-maker under the Water Services Act 2021. This includes responsibilities under settlement legislation for the Waikato, Waipā, Whanganui and Whangaehu rivers. The WSA is also subject to wider Crown obligations that apply across government.

Māori also have strong interests in water that go beyond having their rights recognised. These interests include:

- exercising kaitiakitanga (stewardship) and tikanga (customary practices)
- taking a holistic view of the health of water, the environment, and people
- achieving positive economic outcomes, and
- protecting marae and papakāinga.

Some of these interests are shared more broadly by other New Zealanders.

The proposed NEDS and Codes of Practice are only relevant to some Māori rights and interests. For example, they will not directly affect where water infrastructure is located or decisions about where wastewater is discharged. However, the framework will engage with some Māori rights and interests.

The WSA is required to partner and engage early and meaningfully with Māori under its empowering legislation, including to inform how the Authority can understand, support, and enable the exercise of mātauranga Māori, tikanga Māori, and kaitiakitanga. It will also need to work closely with those iwi whose Treaty settlement legislation impose obligations on it.

The NEDS also have the potential to support more sustainable water infrastructure, improve public health and environmental outcomes, and help reduce some costs, which may improve affordability.

The WSA will need to work closely with iwi and Māori to meet its obligations as the NEDS and Codes of Practice are developed further. This will help clarify how rights and interests are affected. This will be especially important as:

- performance expectations are defined more clearly
- trade-offs between cost and performance become more visible, and

- it becomes clearer where the framework supports Māori interests, or where tensions may arise.

Part 2: What we are trying to achieve

This section sets out the problem definition and objectives to guide this work

Current state, issues and objectives

This section defines the core problem facing the water services system, focusing on the fragmented approach to engineering standards across councils. It outlines how this fragmentation affects long-term risks and outcomes, system operation, costs and competition, and day-to-day delivery.

Problem definition: what is the core issue?

Currently, councils each use their own engineering standards, which has led to a fragmented system with inconsistent requirements across the country.

There are currently **up to 45 different codes in use across New Zealand**. As a result, water services infrastructure is designed and built under a range of different local standards.

Because these technical standards are built into local planning and bylaw frameworks, updating them often requires going through broader statutory processes. In general, infrastructure is designed using these standards, assessed against them, and must meet them before it can be connected to the public network or vested to a council or water service provider.

As a result, infrastructure projects are more expensive and harder to deliver, competition between suppliers is reduced, and there is more uncertainty in how work is approved and carried out. This is particularly challenging as the water sector moves to new service delivery entities and needs to operate more efficiently at scale.

These impacts fall into four main areas: long-term outcomes and risks, how the system operates, costs and competition, and day-to-day delivery. The following sections begin by setting out the broader, longer-term implications of the current system before progressively narrowing to the more specific impacts experienced in day-to-day delivery.

- **Impacts on long-term outcomes**
  - The absence of nationally consistent and transparent performance requirements increases long-term risks.
- **Impacts on how the system operates**
  - Councils or their water services providers either need to maintain multiple customised local codes of practice or risk those codes becoming outdated.
  - The fragmented system may make it harder to efficiently bring services together under new water services providers as councils partner and amalgamate service provision.
- **Impacts on costs and competition**
  - Building and maintaining infrastructure costs more than it should.
  - Differences between councils makes it harder for suppliers and developers to operate across regions, leading to regulatory challenges and bespoke requirements.
- **Impacts on day-to-day delivery**
  - Developers and contractors often tailor designs to meet varying council requirements, creating a barrier to scaling efficient production, acquisition and delivery.
  - Connection and vesting requirements vary between councils, creating uncertainty for developers.

Each of these impacts are explained in further detail below.

Impacts on long-term outcomes

The absence of nationally consistent and transparent performance requirements increases long-term risks

Currently, there is no nationally consistent or transparent set of performance requirements that define how water infrastructure should be designed, constructed, and operated. Councils apply their own local engineering standards, and it is not always clear what level of service, reliability, or resilience infrastructure is being designed to achieve. As a result, there is limited visibility across the system and little assurance that infrastructure is being designed and built to standards that are appropriate and consistent for New Zealand. This means it is difficult to determine whether infrastructure is consistently meeting the levels of performance expected by New Zealanders.

New Zealand's water infrastructure network is estimated to be worth between $40 and $85 billion. It also faces an estimated investment deficit of around $120 billion to $185 billion over the next 30 years.[7] [8]

From the mid-1970s and for nearly two decades after that, investment in water infrastructure did not keep pace with depreciation; pipes and treatment plants deteriorated faster than they were being replaced. As a result, councils now face widespread pipe failures, sewage overflows and leaks, as well as the need for significant new investment to meet the WSA's quality standards.[9]

A recent study found that a substantial share of water supply pipes in New Zealand are in poor condition. Just under a third were assessed as being in poor or very poor condition, and 18.5% were already past their expected life.[10] The study also found pipes had a mean weighted age of 37.8 years.

New Zealand's water supply network is also relatively old and in poorer condition than those in other high-income countries. While international comparisons are not exact because reporting methods differ, 46.2% of New Zealand's water supply pipes are more than 40 years old. This is similar to the United States at 47.0%, based on a sample covering around 20% of that network, but much higher than Japan at 20.7%, Spain at 26.0%, and higher than Canada's 41.0%. New Zealand also has a higher share of pipes in poor or very poor condition, at 30.7%, than Australia at 10.0% and Canada at 9.6%. This places New Zealand toward the higher-risk end of these international comparisons.[11]

The proposal to design NEDS is not intended to require wholesale replacement of existing assets, and legacy infrastructure will continue to be used. However, it is important to consider how existing infrastructure and past design decisions are made more challenging by the current fragmented system.

7 Water Industry Commission for Scotland, "Three Waters Reform: Economic Analysis of Water Services Aggregation", 2021, as referenced in Puente-Sierra, Marrio, Lukas Marek, Matthew Hobbs, and Tim Chambers. "A National Assessment of the Drinking Water Infrastructure Deficit in New Zealand by Territorial Authority and Sociodemographic Characteristics." *Australasian Journal of Water Resources* 29 (1): 35–48. doi:10.1080/13241583.2025.2481694.

8 Infrastructure New Zealand, "Infrastructure New Zealand Position Paper: Water infrastructure and services", 2023, https://infrastructure.org.nz/wp-content/uploads/2023/12/Infrastructure-NZ-Policy-Postions-Water-Infrastructure-002.pdf

9 "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

10 "A National Assessment of the Drinking Water Infrastructure Deficit in New Zealand by Territorial Authority and Sociodemographic Characteristics."

11 "A National Assessment of the Drinking Water Infrastructure Deficit in New Zealand by Territorial Authority and Sociodemographic Characteristics."

- Older networks were built to standards that are now out of date. This means today's infrastructure system still reflects historical design assumptions, materials and risk tolerances that may no longer match current expectations.
- Past decisions continue to shape current performance because infrastructure lasts for a long time. Materials used decades ago can perform differently under seismic or hydraulic stress, and those earlier choices still affect how the system performs today and how vulnerable it is.
- New assets are often connected to older upstream or downstream networks. Even when new infrastructure is designed to modern standards, it still has to operate within the limits of the existing network. This means weaknesses in older parts of the system can carry through into newer assets.

Past infrastructure and design decisions, combined with a lack of consistent and transparent performance requirements, continue to shape the level of risk in the system today and its ability to respond to emerging pressures such as climate change. These factors increase risks to drinking water safety and environmental outcomes, and contribute to reduced confidence in the system's ability to perform effectively. These longer-term risks can appear in different ways across the network.

- The WSA's 2024 Annual Drinking Water Compliance Report identified multiple cases where lead service connections were still in use. Earlier material and design choices create ongoing These ongoing long-term risks to drinking water quality.[12]
- The Havelock North drinking water outbreak in 2016 showed the consequences of weak or inconsistent protections. More than 5,000 people became ill and four people died. The event is widely recognised as an example of a failure to adequately protect drinking water sources and infrastructure, and it illustrates the public health risks that can arise where standards are insufficient or inconsistently applied.[13]
- Adapting to natural hazard risk is becoming an increasingly important driver of water infrastructure investment. Water networks are particularly exposed to coastal and river flooding, and these risks are expected to increase with climate change.[14] Where design standards and approaches vary and are not transparent, networks may have different levels of resilience, and the system may be less able to respond consistently to changing environmental conditions.

Impacts on how the system operates

Regulators either need to maintain multiple customised standards or risk those standards becoming outdated

The current regulatory environment includes many locally developed technical standards, rather than one standardised model.

In many cases, engineering codes are built into district plans or bylaws. This means that updating technical requirements may require formal changes through statutory planning processes. These processes can be slow and make it harder for the system to respond to new technologies, updated practices, or changes linked to the new water services regulatory framework. They may

[12] "Drinking water regulation report 2024".

[13] Government Inquiry into Havelock North Drinking Water, "Report of the Havelock North Drinking Water Inquiry: Stage 2", December 2017, https://www.dia.govt.nz/diawebsite.nsf/Files/Report-Havelock-North-Water-Inquiry-Stage-2/$file/Report-Havelock-North-Water-Inquiry-Stage-2-a.pdf

[14] "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

also create misalignment between older planning tools and current water services arrangements.

Maintaining local codes requires ongoing effort from local authorities and water service providers. They need to review, update and administer technical requirements over time. With around 45 existing codes, this is likely to create a significant amount of repeated regulatory work to update these periodically across the system.

There is also evidence that some regions are using older or outdated standards. This may be more common among smaller local authorities or suppliers that do not have the capacity or capability to regularly maintain and update their standards. This can reduce consistency and may affect compliance.

Under the current system, regulators may face an ongoing choice between continuing to maintain multiple local codes or accepting the risks that come with codes becoming outdated, even while infrastructure continues to be built, maintained and renewed.

The fragmented system may make it harder to bring services together under new entities efficiently

The current water services arrangements were not designed for large-scale or cross-district infrastructure provision of the kind now being pursued through regulatory reform. Under LWDW, the sector is moving toward fewer and larger water service providers. It is assumed that these new or amalgamated entities will inherit the existing local technical standards. In some cases, multi-council entities may inherit more than one code.

Having multiple engineering standards within a single multi-council water services organisation is impractical for the organisation themselves, as well as for their contractors, suppliers and local developers.

This may make it harder for these entities to achieve economies of scale as they are established and transition into new arrangements. It may also reinforce a focus on short-term cost pressures during establishment and transition, rather than on long-term system performance.

More consistent standards across jurisdictions may support the move toward fewer and larger water services organisations. A system with many different standards is inconsistent with Government's reform aims to achieve economies of scale through greater standardisation and amalgamation.

Impacts on costs and competition

Infrastructure costs are higher to build and maintain

Funding water infrastructure has been a major cost pressure for local government for a considerable time. These pressures can be:

- greater in small or spread-out communities, where there are fewer ratepayers to share the cost and the cost per person is much higher than in larger towns and cities, and
- worsened by the need to meet stronger safety and environmental regulations.[15]

Infometrics recently estimated that the cost of building water supply systems increased by 27% between 2021 and 2023, and that water and sewerage systems now cost 21% more than

[15] New Zealand Productivity Commission, "Local government funding and financing", November 2019, https://www.treasury.govt.nz/sites/default/files/2024-05/pc-inq-lgff-final-report-local-government-funding-and-financing.pdf

would have been expected in 2020.[16] While local government, and the new water service providers under LWDW, have access to different funding and financing options, the Infrastructure Commission notes that water charges are often paid through household rates.[17]

The way water supply, wastewater and stormwater are funded and priced creates uneven incentives across the system. In practice, this can lead to a stronger focus on upfront construction costs, with less focus on whole-of-life considerations such as operability, maintenance, and long-term asset performance.

The current fragmentation of local engineering design standards is linked to higher infrastructure costs because it is harder to use common designs, standard approaches, or shared maintenance and renewal practices across council boundaries. As a result, water infrastructure designed and built by developers may cost more than necessary, with little evidence of matching benefits in service quality.

Local Government New Zealand's 2024 Sector Capability Survey found that developers can face design costs equal to 5 to 10% of project budgets when working across districts, as stormwater and wastewater specifications vary unnecessarily.[18]

Consistent nationwide standards could help reduce compliance costs during construction.[19] For example,

- The New Zealand Transport Agency found that standardised infrastructure designs help "deliver faster, more consistent outcomes with lower long-term costs, supporting a more efficient, value-for-money approach to infrastructure investment."[20]
- KiwiRail improved design efficiency by 40% by standardising its bridge design approach and shifting to a consistent Australasian standard adapted for local conditions, enabling more efficient, cost-effective and faster delivery.[21]

Competition is limited

Fragmented local engineering design standards make it harder for firms operating nationally and across different regions, because there are fewer opportunities to use standard approaches across design, procurement, construction and maintenance. This can affect the market in a few ways:

- It may reduce the ability of providers to operate at scale across regions, which can limit competition.
- The lack of nationally consistent standards for infrastructure and procurement can make it harder for suppliers to participate in the market and can reduce the range of suppliers available.

While there is some commonality between local codes, the differences between regional, city and district requirements for reticulation networks have created small and fragmented markets. This makes it hard for suppliers move across

16 Infometrics, "Analysing increases in local government costs for Local Government New Zealand", February 2024, https://d1pepg1a2249p5.cloudfront.net/media/documents/Analysing_increases_in_local_government_costs_LI2BVKU.pdf

17 Around 57% of users are charged through volumetric water charges, but this statistic is skewed by volumetric charging in Auckland. For most New Zealand properties, water is still charged through rates on connected properties. "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

18 Local Government New Zealand, "Sector Capability Survey", 2024, as cited in Beca, "National Engineering Design Standards (NEDS) and Codes of Practice (COPS) Business Case", November 2025.

19 "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

20 New Zealand Transport Agency, "NZ Transport Agency annual reports for the year ended 30 June 2025", November 2025, https://nzta.govt.nz/assets/resources/annual-report-national-land-transport-fund-annual-report-202425/nzta-annual-report-2025.pdf.

21 Coleman, Liam. "Fast-tracking bridge construction", *EG*, March 2026, https://www.engineeringnz.org/news-insights/fast-tracking-bridge-construction/.

boundaries and may lead to higher costs than necessary.

The New Zealand Infrastructure Commission Te Waihanga notes that planning and delivering water infrastructure across geographic boundaries can support more efficient procurement, and that standardisation can help streamline the consenting process.[22]

Where they can, some councils do work collaboratively or use standards developed elsewhere. However, reviewing and updating engineering codes is an ongoing task that requires significant expertise and resources. This is a particular challenge for smaller councils. Differences in how up to date council-specific codes are, add to the fragmentation of the system and can reduce competition by making it harder to provide services across council boundaries.

Impacts on day-to-day delivery

Developers and contractors often tailor designs to meet varying council requirements, creating a barrier to scaling efficient delivery

As noted earlier, there are currently up to 45 different local engineering standards used by councils for designing and building water infrastructure.

While many of these standards are similar, they often include different requirements for key elements such as pipe sizes, materials, and construction methods. In some cases, these differences go beyond what is needed to reflect genuine local conditions (for example, earthquake risk or weather resilience). This means that the same type of infrastructure is designed and built differently depending on where it is located. For example, the previous Wellington Water[23] *Regional Standard for Water Services* aims to improve consistency but still includes some requirements that vary by city/town.[24]

Example: Wellington Water's Regional Standard for Water Services

Section 3.5 Applications and approvals: "Developers are encouraged to discuss their proposed scheme with Wellington Water prior to concept design to ascertain requirements or pertinent considerations relating to their proposal. This document does not cover the applications and approvals process. Each council has its own subdivision and approvals process by which the applicant must abide. Compliance with the provisions in this standard does not imply acceptance of the asset for vesting or compliance with the subdivision consent."

Section 3.8 Building in close proximity to public pipelines: "Written approval is required from Wellington Water for any building work over or near a public pipe... Written approval is typically not granted for works in Porirua City Council or Upper Hutt City Council as these councils do not support building over public mains."

These differences limit the application of consistent approaches across projects, creating a

22 "National Infrastructure Plan Mahere Tūāhanga ā-Motu 2026".

23 Wellington Water was replaced by Tiaki Wai on 1 July 2026. Wellington Water serviced five territorial authorities: Wellington City Council, Hutt City Council, Upper Hutt City Council, Porirua City Council, and South Wairarapa District Council.

24 Wellington Water, "Regional Standard for Water Services STD_0001, December 2024 Version 3.1", December 2024, https://qpulse.wellingtonwater.co.nz/QPulseDocumentService/Documents.svc/documents/active/attachment?number=STD_0001.

barrier to scaling efficient design, construction, and operation across regions.

As a result, developers, designers and contractors must adapt and modify designs to meet local requirements across different areas, creating inefficiencies. For example:

- designs and components often need to be adjusted to meet different local engineering standards, even where the underlying infrastructure need is the same
- there are fewer opportunities to standardise designs or apply repeatable approaches across projects, limiting the ability to scale delivery across regions
- it is harder to use more efficient procurement approaches due to varying technical requirements, and
- there are instances of non-compliant or lower-quality connections to public networks, particularly where requirements are interpreted differently across councils or projects.

In addition, firms operating across multiple council areas face additional inefficiencies when delivering infrastructure prior to vesting. National firms can face higher compliance and transaction costs, and smaller suppliers can find it harder to operate across council boundaries.

Vesting requirements vary between councils, creating uncertainty for developers

Section 147 of the Local Government (Water Services) Act 2025 establishes a three-step process for approving vested connections through local water services bylaws. This creates a more consistent framework for how approvals are progressed, including:

- Step 1: approval of concept plans
- Step 2: approval of engineering plans, and
- Step 3: final approval and sign-off.

While this legislation provides greater consistency in the approvals process, it does not in itself standardise the engineering criteria or performance expectations that underpin these decisions.

The Local Government (Water Services) Act also requires that bylaws regulating the connection and vesting must comply with the NEDS, and provides for territorial authorities to review and update their bylaws within two years of the legislation being enacted.[25]

While the approval process is becoming more consistent, the underlying standards and criteria used to assess proposals remain fragmented.

Given that this legislation was only introduced in 2025, existing bylaws are yet to be reviewed and updated to meet new requirements. In practice, vesting and approval processes continue to be governed by existing local engineering standards and council-specific processes. Over time, as territorial authorities update their bylaws to comply with the NEDS, this is expected to result in more consistent requirements for vesting across councils.

The primary source of variation is in the engineering standards used to assess vesting proposals, as opposed to the approvals process itself. These standards set out how councils expect infrastructure to meet their desired service levels, which means developers face different requirements depending on where they build.

Even where infrastructure meets technical expectations, developers can still face delays or be required to redesign work because of differences in how standards are interpreted. This creates uncertainty during approval and vesting processes – in the short term, it can be unclear what will be accepted and in the longer term,

[25] Sections 147 and 263, Local Government (Water Services) Act 2025.

this uncertainty can make planning and investment decisions more difficult.

While approval processes are likely to become more consistent with the introduction of the approvals bylaw and requirement for bylaws to comply with the NEDS, current decisions still rely on local standards and interpretation of those standards. This means developers continue to face risks of delays or rework where council expectations differ.

There can also be differences in how standards are applied within organisations. Similar proposals may be assessed differently depending on internal interpretation, which reduces consistency and predictability.

What are the regulatory objectives of the NEDS?

Regulatory objectives are the outcomes that a regulatory system is designed to achieve. This section sets out the regulatory objectives that the NEDS regime aims to achieve.

There are five objectives for the NEDS regime:

- Provide a high degree of national consistency and transparency in requirements for the design, construction, and operational performance of water services networks to support interoperability, collaboration, and amalgamation of networks.
- Increase network resilience, including system performance under stress.
- Achieve efficiency improvements and whole-of-life cost savings in developing and operating water networks.
- Increase trust and confidence in water services infrastructure.
- Strengthen public health, safety, and environmental outcomes through requirements for the design, construction, and operational performance of water services infrastructure.

Table 2 provides an explanation of why each objective was chosen, and what it means in practice. These objectives translate the current system problems into clear outcomes for the NEDS. In practice, they describe how water infrastructure should perform, how consistently it should be delivered, and what it should achieve in terms of cost, resilience, public confidence, and protection of health and the environment.

Table 2: Regulatory objectives

Objective	Aim of the objective	The objective in practice
Objective 1: Provide a high degree of national consistency and transparency in requirements for the design, construction, and operational performance of water services networks to support interoperability, collaboration, and amalgamation of networks	This objective responds directly to the current problem of fragmented local standards and inconsistent requirements across councils.	**This objective will reduce variation in standards and provide clearer expectations across the system.** For example: • water services infrastructure is designed and constructed to broadly consistent standards across New Zealand • developers and suppliers have greater certainty about requirements, regardless of location (except where local conditions apply) • water service providers can work together more easily, and • there is less need to redesign assets for different regions.
Objective 2: Increase network resilience, including system performance under stress	This objective reflects the need for infrastructure to perform reliably over time, including when under stress (such as during natural hazard events exacerbated by climate change, or system failures).	**This objective will improve the ability of infrastructure to function effectively in a range of conditions.** For example: • infrastructure is designed to cope with peak demand and extreme conditions, reducing the likelihood of failures • networks are more reliable and less prone to disruption, and • performance is maintained during events such as floods, droughts, and network faults.
Objective 3: Achieve efficiency improvements and whole-of-life cost savings in developing and operating water networks	This objective aims to reduce the total cost of delivering and operating water infrastructure over its full lifecycle, while maintaining appropriate performance and service levels.	**This objective will support more efficient delivery of infrastructure and reduce unnecessary costs across the full lifecycle of water networks.** For example: • standard designs and components are more widely used • economies of scale in procurement and delivery are improved • redesign, duplication, and variation between regions are reduced, and • there is a stronger focus on whole-of-life costs, not just upfront construction costs.
Objective 4: Increase trust and confidence in water services infrastructure	This objective recognises the need to maintain public confidence in water services, particularly given past failures and visible infrastructure problems.	**This objective will improve confidence that the system is operating effectively.** For example: • infrastructure is consistently built and maintained to an appropriate standard • requirements are applied more consistently across the system, and • confidence is strengthened among communities, regulators, and the water services industry.

Objective 5: Strengthen public health, safety, and environmental outcomes through requirements for the design, construction, and operational performance of water services infrastructure	This objective reflects the core purpose of water regulation, which is to protect and the environment.	**This objective will ensure that infrastructure supports safe and environmentally responsible outcomes.** For example: • infrastructure supports safe drinking water, effective wastewater treatment, and appropriate stormwater management • design and operation reduce risks such as contamination, overflows, and pollution, and • there is stronger alignment with drinking water and environmental performance standards.

Design principles for the NEDS framework

Design principles guide the choices in the report

The design principles have been developed by drawing together:

- The statutory purposes and scope of NEDS, including national consistency, efficiency, reliability and resilience, public health and safety, and continuous improvement.
- The current-state problems the regime is intended to address, including fragmented local standards, inconsistent approval and vesting processes, duplicated effort, higher costs and uneven long-term outcomes.
- The regulatory objectives of the NEDS.
- Lessons from performance-based regulatory frameworks including the New Zealand building regime.
- The nature of water services infrastructure, including its networked, long-lived and locally embedded nature.
- Practical implementation considerations tested with technical specialists through project workshops.

The principles also reflect wider expectations of good regulatory design. The New Zealand Government's Government Expectations for Good Regulatory Practice state that regulatory systems should have clear objectives, achieve those objectives in a least-cost way, allow efficient and innovative approaches, produce predictable and consistent outcomes, treat regulated parties proportionately, align with related systems, be easy to find and understand, and be able to evolve as circumstances change.[26]

The principles are not intended to operate as rigid rules. The design of NEDS requires choices between objectives that can create tensions or pull in different directions. For example:

- A more detailed and specific NEDS may provide greater certainty for users but may also reduce flexibility and make the framework harder to maintain.
- A more flexible framework may strongly enable innovation but may also increase reliance on professional judgement and evidence, risking uneven application.
- High national consistency may address fragmentation issues but must still allow genuine local physical conditions to be reflected and accounted for.

The purpose of the principles is therefore to help make these trade-offs explicit.

The core design challenge

NEDS are intended to create a nationally consistent, performance-based framework that reduces fragmentation and improves efficiency, while remaining flexible enough to accommodate different local conditions, support innovation, and deliver resilient, affordable and high-performing water services infrastructure over the long term.

Meeting the core design challenge requires the NEDS to:

[26] New Zealand Government, Government Expectations for Good Regulatory Practice (April 2017), https://www.regulation.govt.nz/assets/Uploads/Government-Expectations-for-Good-Regulatory-Practice.pdf.

- **Replace the current fragmented system of local engineering standards with a clear and nationally consistent framework** for the design, construction and operational performance of water services infrastructure.
- **Support more efficient infrastructure delivery, reduce unnecessary variation, and provide clear expectations** for users, including developers, designers, contractors, and water service providers.
- **Remain suitable for a sector where infrastructure is networked, long-lived, locally embedded and often highly dependent on engineering judgement.** National consistency may mean nationally consistent outcomes, methods and decision rules, with local variation controlled through defined inputs where those inputs genuinely affect infrastructure performance.
- **Operate coherently as one part of a broader regulatory system.** NEDS should complement rather than duplicate drinking water quality, environmental, workplace safety, economic, planning or asset management regimes.

The key trade-offs to balance

The design principles below have been developed to help manage the trade-offs in Table 3 throughout options design.

Table 3: The key trade-offs to balance

Trade-off	Implication
National consistency vs. legitimate local variation	NEDS needs to reduce unnecessary local variation, while still allowing infrastructure to respond to defined local conditions where those conditions affect performance.
Performance-based flexibility vs. certainty of compliance	NEDS should be flexible enough to allow different approaches to meet requirements through the alternative solutions pathway. However, requirements still need to be clear and specific enough to interpret, evidence and assess consistently.
Proportionality vs. simplicity	Uniform requirements are simple but may over-regulate low-consequence infrastructure or under-regulate high-consequence infrastructure. The framework needs a practical way to scale requirements, evidence and assurance.
Usability vs. technical completeness	NEDS needs to be technically credible and complete, but it will only work if users can find, understand and apply the requirements that matter to them.
Affordability vs. whole-of-life value	Lower upfront cost does not always mean better value. NEDS should support efficient delivery while protecting long-term asset performance, resilience, maintainability and service reliability.
Ambition vs. readiness	A broader first edition may provide more national direction, but may take longer, increase transition burden, or require detail before the evidence base is ready. A smaller first edition may be faster but risks a piecemeal framework.

The design principles

The principles below provide the basis for assessing the design choices in the following sections. Each principle responds to one or more of the trade-offs identified above.

These will also be relevant to the detailed development of requirements and Codes, and the WSA may wish to carry these through that next phase.

Principle 1: Coherence

NEDS should provide a clear line of sight from the statutory purposes of the regime to the requirements users need to comply with in practice.

A coherent framework helps avoid requirements being developed in isolation. It also helps the WSA add further requirements and Code pathways over time without creating or sustaining the fragmentation the regime is intended to resolve.

Design test: *Does the framework provide a clear line of sight from statutory purposes to objectives, to requirements, to compliance pathways?*

Principle 2: Clarity and usability

NEDS should be clear enough for users to understand what is required and how compliance will be assessed.

This includes water service providers, developers, designers, contractors, asset managers, assessors and the WSA. A technically complete framework will not work if users cannot find, understand or apply the requirements relevant to them.

Design test: *Can users find, understand and apply the requirements that are relevant to them?*

Principle 3: National consistency with justified variation

NEDS should reduce unnecessary local variation, duplication and inconsistency.

National consistency does not mean ignoring genuine local conditions. Water infrastructure must perform in different physical, climatic, environmental and network contexts. The framework should allow variation where it is justified by infrastructure performance, while avoiding variation based only on legacy practice or local preference.

Design test: *Does the framework reduce unnecessary variation while allowing variation where it is justified by performance?*

Principle 4: Proportionate regulation

NEDS should avoid imposing more control, cost or process than is needed to achieve its objectives.

This reflects good regulatory practice. Regulatory controls should be justified by the issue being managed and should achieve their objectives in a least-cost way.

Where stronger requirements or assurance are used, the reason for that stronger control should be clear. Where lighter treatment is used, it should still be sufficient to achieve the relevant objective.

Design test: *Does the framework provide a clear basis for deciding what level of obligation, evidence and assurance is justified?*

Principle 5: Affordability and whole-of-life value

NEDS should support efficient and financially sustainable water services infrastructure.

This means reducing avoidable cost and duplication but also considering value over the life of the asset. Lower upfront cost is not always better value if it leads to higher operating, maintenance, renewal, failure or adaptation costs over time.

Design test: *Does the framework support efficient delivery while protecting long-term asset performance, service reliability and resilience?*

Principle 6: Flexibility and innovation

NEDS should enable different ways to meet the required performance.

A performance-based framework should not lock users into one design, product or method unless that is justified. Codes of Practice can provide recognised and efficient pathways for common situations, but alternative solutions need to remain a real pathway where different approaches can demonstrate the required performance.

Design test: *Does the framework enable innovation and alternative solutions while maintaining a consistent basis for assessing compliance?*

Principle 7: Māori rights and interests

NEDS should support Māori rights and interests where they intersect with infrastructure performance.

NEDS is not the only, or primary, mechanism for addressing Māori rights and interests in water. However, infrastructure performance can affect water health, public health, environmental outcomes, resilience, affordability, marae, papakāinga and the exercise of kaitiakitanga. The framework should recognise these intersections while remaining clear about the scope of NEDS.

Design test: *Does the framework support Māori rights and interests where they are affected by infrastructure performance?*

Principle 8: Continuous improvement and stewardship

NEDS should be capable of improving over time.

Given the broad scope, the first edition of NEDS will not be the end state. The framework will need to be monitored, maintained and updated as evidence, technology, hazards, climate assumptions, network conditions, sector practice and capability change.

Design test: *Can the framework be updated and improved over time without unsettling the overall regulatory architecture?*

The next section identifies the key design choices that put these principles into practice. It explains the options considered, the working positions reached, and the trade-offs that the WSA may wish to test further through engagement.

Part 3: Design of the NEDS framework

This section sets out the main design choices for the NEDS, across the overall architecture, the performance domains and requirements, and the compliance pathways

Key design choices for the NEDS framework

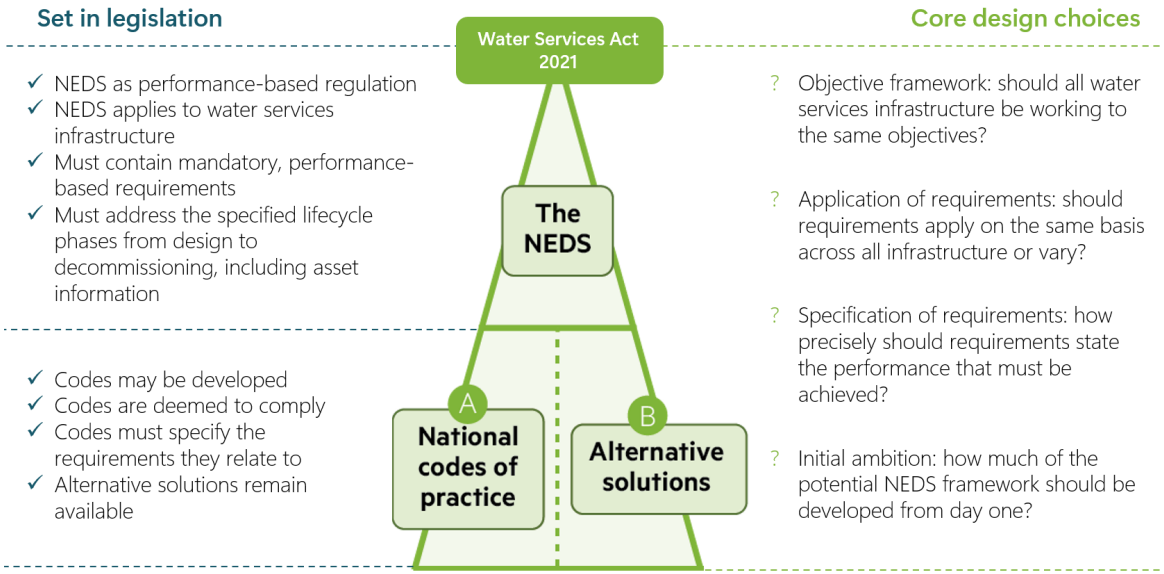
While the legislation sets the basic shape, important design choices remain

Part 2 of this report set out the basic shape of the NEDS framework established by the Water Services Act 2021. The Act establishes NEDS as a performance-based framework, details requirements across the infrastructure lifecycle, and provides for Codes of Practice and alternative solutions.

Within these parameters, important choices remain about how the framework should work in practice. We have focused on four first-order design choices:

1. **Objective framework:** Should NEDS establish common objectives across the three waters, or develop different objectives for different water services or parts of the network?
2. **Application of requirements:** Should requirements apply uniformly, or vary based on the role and importance of different infrastructure?

Figure 6: The core design choices for the NEDS framework



3. **Specification of requirements:** How precisely should requirements state what infrastructure must do and the performance benchmark it must meet?
4. **Initial ambition:** How much of the potential framework should be developed into detailed requirements and recognised Code pathways initially?

These choices are connected. They determine what outcomes anchor the framework, how proportionately it applies, how much certainty its requirements provide, and the scale and pace of initial development.

The sections below work through each choice in detail, considering the options available within them. Following this, the report considers the overarching framework options available, based on these choices. More detailed design matters, including classification, the role and structure of Codes of Practice, and how the performance bar is set, are addressed through the preferred approach section.

CORE DESIGN CHOICE 1

Objective framework

Should all water services infrastructure work towards the same objectives?

NEDS is a performance-based regulatory framework. This means setting what water services infrastructure should achieve, rather than prescribing exactly how it must be designed or operated. The framework therefore needs to be clear about the outcomes it is seeking.

The first design choice is the level at which those outcomes are defined. Should NEDS establish a common set of high-level objectives for all water services infrastructure or define different objectives for particular water services or parts of the network?

This choice matters because the objectives set the overall direction for NEDS and shape how the rest of the framework is developed, including the requirements that make the objectives specific and assessable.

1. Objectives for parts of the network allow close tailoring, but risk losing sight of network performance

Objectives could be developed separately for different parts or functions of water services networks, such as pumping, storage or conveyance.

Strengths

This would allow close tailoring to the purpose and performance of particular infrastructure and would support staged development of the NEDS over time.

Limitations

Water services depend on infrastructure working together as a network. Good performance by one part of the network does not necessarily mean better performance for the network as a whole. For example, increasing the capacity of a wastewater pump station may reduce a local capacity constraint, but create additional pressure downstream if the receiving network cannot manage the higher flow.

Defining objectives piece by piece could therefore make these wider network effects and trade-offs harder to see. [27] It could also create gaps or inconsistent treatment of issues that cut across different parts of the network.

The wider NEDS framework would emerge progressively as individual areas are developed, risking a fragmented rather than coherent national framework.

2. Water-specific objectives reflect the distinct role of each service, but risk reinforcing silos

Separate objectives could be developed for water supply, wastewater and stormwater.

Strengths

This would clearly reflect the different purposes, functions and risks of each water service. It may also be more intuitive for those who primarily work within one water service.

Limitations

Many important performance concerns cut across the three waters, including reliable service, resilience and long-term infrastructure performance. Separate frameworks would need to repeat these concerns and could allow similar issues to be framed or treated differently over time.

[27] Coglianese, C. (2016). 'Performance-Based Regulation: Concepts and Challenges' in Francesca Bignami and David Zaring (eds), Comparative Law and Regulation: Understanding the Global Regulatory Process (Edward Elgar, 2016).

This approach therefore risks reinforcing existing service silos rather than providing a consistent view of the wider outcomes water services infrastructure collectively supports.

3. Common objectives provide a coherent framework, but must remain meaningful

NEDS could establish common high-level objectives across water supply, wastewater and stormwater.

Strengths

This approach starts with the outcomes the regime cares about, rather than with individual infrastructure or water-service boundaries. It would provide a shared performance foundation, make common concerns explicit and give the NEDS a stable framework as more detailed requirements are developed.

It would also provide a consistent lens for considering performance across the three waters, while still allowing requirements to reflect the different functions and characteristics of particular infrastructure.

Limitations

The main risk is that common objectives become so broad that they provide little meaningful direction. The objectives would therefore need to be limited to outcomes that genuinely matter across the three waters and be made specific and assessable through the more detailed NEDS requirements.

Implication for the main options: This choice determines whether NEDS starts from separate expectations for particular infrastructure or services, or from a common performance framework for water services infrastructure as a whole. This is one of the key differences between the broader options in the next section.

CORE DESIGN CHOICE 2

Application of requirements

Should NEDS requirements apply on the same basis to all infrastructure?

The first design choice considered whether all water services infrastructure should work towards the same high-level objectives.

Common objectives do not mean every objective must translate into requirements for every part of the network, or that those requirements must apply in the same way.

Different parts of a network perform different roles and the consequences of non-performance can vary significantly. The choice is whether requirements should apply uniformly, or selectively and proportionately based on the role and importance of infrastructure.

1. Uniform application is simple and predictable, but may set the wrong expectations for different infrastructure

Under this approach, the role or importance of infrastructure would not affect which requirements apply or the level of expectation. Requirements would apply on the same basis wherever they are relevant to a particular type of infrastructure.

Strengths

This would provide a simple and predictable framework. Users could more easily identify what applies, with less need for judgments about the relative importance of infrastructure.

It would also be relatively straightforward for the WSA to develop, as requirements would not need to specify how expectations vary for infrastructure of different importance.

Limitations

Different parts of a network do not contribute equally to network performance or create the same consequences if they underperform. Uniform requirements could impose unnecessary requirements or assurance on lower-consequence infrastructure, while setting too low a bar for infrastructure that is critical to network performance.

Uniformity would therefore come at the expense of proportionality.

2. Selective and proportionate application better reflects the importance of infrastructure, but adds complexity

Under this approach, the requirements applying to infrastructure could vary based on its role or importance in the network.

A requirement could apply only to specified infrastructure, set a higher performance bar for more important infrastructure, or require greater evidence or assurance where the consequences of non-performance are higher.

Strengths

This would focus regulatory effort where performance matters most and avoid imposing requirements that add little value for lower-consequence infrastructure. It also recognises that similar infrastructure can have very different significance depending on the function it performs and its place in the wider network.

Limitations

The trade-off is greater complexity. For the WSA, detailed development would require decisions about where each requirement applies and when higher performance or assurance is justified. This is likely to require more technical development

and testing. The framework would also need a clear and nationally consistent basis for making these distinctions. Without this, proportionality could reintroduce the inconsistent judgment that NEDS is intended to reduce.

Implication for the main options: we consider that NEDS requirements should be able to apply selectively and proportionately rather than on the same basis to all infrastructure. This is therefore treated as a settled design preference.

CORE DESIGN CHOICE 3

Specification of requirements

How precise should NEDS requirements be?

The first design choice considered the level at which NEDS should define the outcomes it is seeking. The second asks where and how requirements should apply. The third asks how precise each requirement should be once it is developed.

Performance-based requirements can be expressed loosely or precisely. The choice is not whether NEDS should prescribe a particular design or solution. It is how much judgment should remain when deciding whether the required performance has been achieved.

Performance standards can range from broad statements of expected performance to tightly defined outcomes, while still remaining performance-based if they do not dictate the means of compliance.[28]

Table 4: Illustrative examples of specification options

Design choice option	Example requirement	What this means
High-level requirements	*"The drinking water network must minimise water loss."*	Identifies the outcome sought but leaves significant judgement about acceptable performance and whether the requirement has been met.
Clear and assessable requirements	*The drinking water network must minimise avoidable water loss while maintaining required service levels. Water loss must not exceed [X], measured using the specified water-loss metric, and leakage and repair-response targets [Y and Z] must be met."*	Specifies the performance benchmark needed to assess compliance, while leaving flexibility in how the network achieves that performance.
Highly specified requirements	*"Water loss must not exceed [X] litres per connection per day, calculated over a rolling 12-month period using [specified methodology]. Leaks must be classified using [specified categories and thresholds] and repaired within [specified timeframes for each category]."*	Specifies not only the performance benchmark, but detailed parameters, assessment conditions and methods. This provides greater certainty but puts much more technical detail in the mandatory NEDS.

This matters because NEDS needs to preserve flexibility in how performance is achieved while providing a clear enough benchmark to assess compliance consistently. Clear benchmarks are particularly important for alternative solutions, which must demonstrate that the same NEDS requirements are met.

[28] Ibid.

1. High-level requirements preserve flexibility and are quicker to develop, but leave significant room for interpretation

NEDS could express required performance broadly. For example, a requirement might state that infrastructure must be durable without defining the level of durability expected.

Strengths

This would leave significant scope for engineering judgement and different contexts. It would also be quicker and less technically demanding for the WSA to develop.

Limitations

However, broad requirements provide a weak benchmark for assessing compliance. Different water service providers could reach different conclusions about whether the same solution meets the requirement.

For long-lived infrastructure, actual performance may also not be clear until infrastructure underperforms or fails. This creates uncertainty for designers, developers and providers and risks carrying inconsistent decision-making into the national framework.

2. Clear and assessable requirements provide a consistent compliance benchmark while preserving flexibility

NEDS could state the required performance clearly enough for compliance to be assessed consistently, while leaving flexibility in how that performance is achieved.

Strengths

This would provide a common benchmark for Codes and alternative solutions. Users would know what performance must be demonstrated, while retaining scope to use different designs, technologies and methods.

Clear benchmarks make flexibility more usable in practice. Research on performance-based regulation notes that flexibility is more useful where regulated parties can demonstrate performance and have confidence about what will be accepted as compliant.[29]

Limitations

The WSA would need to undertake more detailed technical work to define how performance is assessed and, where needed, appropriate measures or thresholds.

This takes more time and technical effort than setting broad requirements, but provides the clearer national benchmark needed for consistent compliance decisions.

What makes a requirement clear and assessable?

A clear and assessable requirement tells users what infrastructure must do and provides a clear basis for deciding whether it has been met. This means distinguishing between two parts of a requirement:

- **Functional requirement:** sets the function the infrastructure must perform.
- **Performance requirement:** sets the benchmark for deciding whether that function has been met.

Together, these mean the NEDS give a clear benchmark for assessing compliance.

[29] Ibid.

3. Highly specified requirements provide greater certainty, but increase complexity and may narrow practical flexibility

NEDS could define required performance through detailed thresholds, parameters or conditions.

Strengths

This would provide greater certainty and reduce the scope for different interpretations. A tightly specified requirement can still be performance-based where it defines the result to be achieved but leaves flexibility in the means used to achieve it.[30]

Limitations

Greater specification can narrow the range of approaches that can readily demonstrate compliance. It may also require detailed measurement, testing and evidence rules to ensure the performance benchmark is assessed consistently.

This would require significantly more upfront technical development by the WSA and could make the framework more complex to maintain as evidence and technical practice change.

Implication for the main options: We consider that NEDS requirements should be clear and assessable. This is carried through all three overall options and is therefore a settled design preference.

[30] Ibid.

CORE DESIGN CHOICE 4

Initial ambition

How much of the NEDS framework should be developed in the first edition?

The objective framework and decisions about proportionate application create many potential areas where NEDS requirements could be developed. The decision to make those requirements clear and assessable means each area will require substantive technical work.

The final choice is how much of this development programme should be completed for the first edition. This is about the pace and scale of detailed development, rather than the eventual scope of NEDS.

It includes both which requirements are developed and where recognised Code pathways are developed alongside them.

Developing more content upfront would provide broader national direction sooner but take longer and require greater WSA capacity. Developing less would allow detailed direction to be established sooner in selected areas but leave more areas for later development.

1. Targeted development would deliver detailed direction quickly in selected areas, but risk a piecemeal framework

Under this approach, requirements and selected Code pathways would be developed for a small number of priority areas.

Strengths

This would keep the initial development programme tightly focused and allow detailed national direction to be established relatively quickly where there is an immediate need.

Limitations

Most potential requirement areas would remain without detailed national direction in the first edition. Without a whole-of-framework approach to sequencing, the areas developed first may be shaped by the most immediate or readily identifiable issues rather than a consistent view of where national direction would add the greatest value.

The wider programme could therefore become more piecemeal as further areas are added.

2. Prioritised development would take a whole-of-framework view, while focusing detailed work where it adds most value

Under this approach, potential requirement areas would be considered across the NEDS framework and detailed requirements developed first in priority areas using an agreed prioritisation approach. Recognised Code pathways would be developed where a national deemed-to-comply pathway is justified.

Strengths

This would allow the WSA to establish the overall direction of the framework while concentrating detailed development where early national direction is expected to make the greatest difference and the technical basis is ready.

Limitations

Some areas would remain without detailed national requirements for longer. The WSA would also need a clear and credible basis for deciding what is developed first and an ongoing programme for building out the framework over time.

3. Comprehensive development would provide broader national direction from the outset, but require a much larger development programme

Under this approach, requirements would be developed broadly across most potential requirement areas, with recognised Code pathways developed for most requirements, where justified.

Strengths

This would provide the sector with the broadest national direction from the outset and leave fewer areas for later development.

Limitations

This would require a significantly larger and longer programme of technical development, testing and consultation.

The WSA may also need to develop detailed requirements in areas where the case for early national direction, the evidence base or the technical approach is less settled. This could delay the first edition and use substantial development capacity in areas where early intervention may add less value.

Implication for the main options: The three approaches above are carried through directly into the main options: targeted, prioritised and comprehensive NEDS.

The next section brings the four design choices together into targeted, prioritised and comprehensive approaches for the first edition of NEDS.

Options for the initial NEDS framework

We developed three coherent options for the initial NEDS

The previous section covered the longlist of options considered within each of the four design choices. Following this, we considered how different positions across those choices could be combined into overall approaches to the first edition of NEDS.

Not every possible combination was retained as a separate option. We shortlisted the combinations that formed coherent, materially different and practically credible approaches.

Our analysis identified two design positions that should apply across all shortlisted options: requirements should be clear and assessable and should be able to apply selectively and proportionately based on the role and importance of infrastructure.

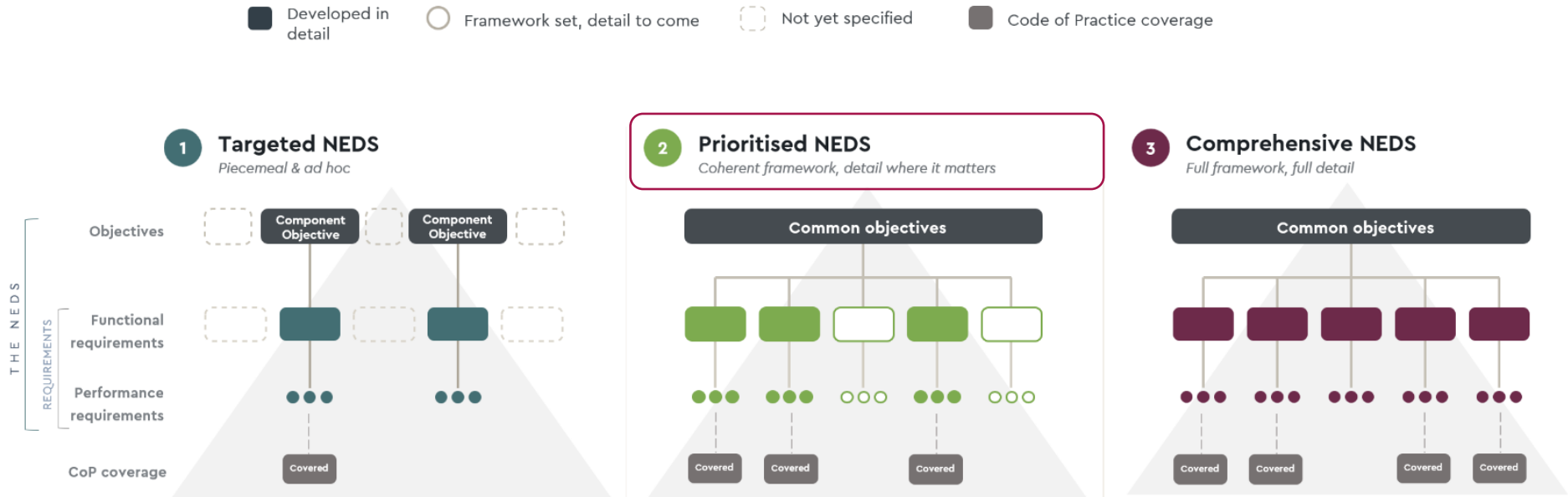
The shortlisted options therefore differ on the remaining choices that create the most meaningful strategic alternatives: whether NEDS establishes common objectives across the three waters from the outset, and how much detailed requirement and Code development is undertaken initially.

The resulting options span a practical spectrum:

1. **Targeted NEDS:** develop objectives, requirements and Code pathways for a small number of selected areas and build the framework over time.
2. **Prioritised NEDS**: establish the common framework, then develop priority requirements and Code pathways first.
3. **Comprehensive NEDS:** establish the common framework and develop detailed requirements and Code pathways broadly across most areas upfront.

Figure 7 shows an overview of these options. The following sections explain each option before assessing them against the agreed criteria.

Figure 7: The approaches considered



Objectives are set for specific infrastructure components. A handful of priority requirements hang off them, each built in full, but the framework is disconnected and ad hoc. Some Code materials are developed but this is limited.

Common objectives that apply to all water services infrastructure are developed. Priority requirements are detailed now; the rest are scoped and ready to fill in over time. Code materials are developed where they provide a strong benefit.

Every common objective and requirement is fully developed. A complete, fully-detailed framework from day one, at the largest initial effort. Code materials for most requirements are developed.

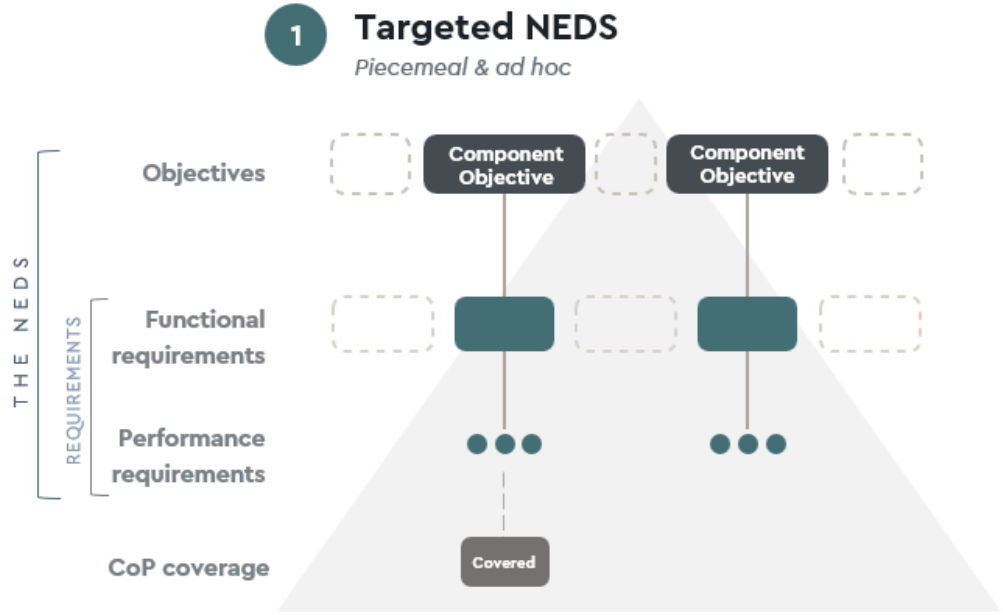
Option 1: Targeted NEDS

Develop a small number of selected areas first and build the framework over time

A targeted NEDS would start with detailed requirements for a small number of selected infrastructure components, functions or lifecycle points. Recognised Code pathways would be developed for those areas where justified.

This option prioritises speed and focus over establishing a common performance framework from the outset. It would allow the WSA to move quickly in areas where national direction is most immediately needed, but the wider NEDS framework would emerge progressively as further areas are added.

Figure 8: Option 1 overview



How this option resolves the design choices

1. Objective framework

Objectives are developed only for selected infrastructure components, functions or lifecycle points. This allows close tailoring, but means the first edition would not establish common objectives across water services infrastructure as a whole.

2. Application of requirements

Requirements can apply selectively and proportionately based on the role and importance of infrastructure within the targeted areas.

3. Specification of requirements

Requirements are clear and assessable where they are developed.

4. Initial ambition

Detailed development is limited to a small number of selected areas, with further areas added over time.

How this option would work

The WSA would select a small number of areas for initial development. For each area, it would define the objectives sought, develop clear and

assessable requirements and determine whether a recognised Code pathway is needed.

This would allow detailed national direction to be established relatively quickly in those areas. Further objectives, requirements and Code pathways would be added over time.

For areas not covered in the first edition, existing local Codes would likely continue to do much of the practical work. This means users would need to navigate a mixed system: national NEDS requirements and Code pathways for selected areas, and local requirements for everything else.

Strengths

- ✓ **Faster to establish.** The initial development task would be smaller and more tightly bounded. This could allow the WSA to publish detailed requirements and Code pathways sooner in a limited number of areas.
- ✓ **Concentrates WSA and engagement effort.** Technical development and sector input can be focused on a small number of immediate priorities.
- ✓ **Provides early certainty in selected areas.** Users would get clearer national direction sooner where requirements and Code pathways are developed. This could be useful in areas with high current variation or persistent issues.
- ✓ **Allows learning before wider rollout.** The WSA could test drafting, compliance pathways and implementation arrangements before expanding the framework.

Limitations

- Θ **Continued fragmentation outside selected areas**. The first edition would only replace local variation in the areas it covers. For other infrastructure, developers, designers and WSPs would still need to rely on local Codes. This would preserve much of the current patchwork the NEDS is intended to resolve, for a longer period of time relative to other options.
- Θ **No common performance framework from the outset.** The first edition would focus on selected areas rather than establishing common objectives across water services infrastructure as a whole. This would make it harder to manage network-wide performance, lifecycle issues and cross-cutting trade-offs consistently as NEDS expands.
- Θ **Risk of piecemeal system development.** Because objectives and requirements would be developed area by area, the overall framework would emerge incrementally rather than by design. This could make it harder to show how requirements relate to each other, and harder to build a coherent framework over time.
- Θ **Limited national direction initially.** Most potential requirement areas would remain without detailed NEDS requirements for longer. This would reduce the immediate benefits of national consistency and leave many users operating under local requirements for some time.

Choose this option if...

Establishing detailed national direction quickly in a small number of selected areas is the overriding priority.

This option would reduce the scale and time required for initial development. However, it would only partially address the fragmentation and inconsistency the regime is intended to resolve. It would create a mixed system where NEDS applies in selected areas while local Codes continue elsewhere. That may be easier to establish initially, but it risks locking in a piecemeal transition path and making the eventual national framework harder to build.

We **do not recommend** this option.

Option 2: Prioritised NEDS (preferred)

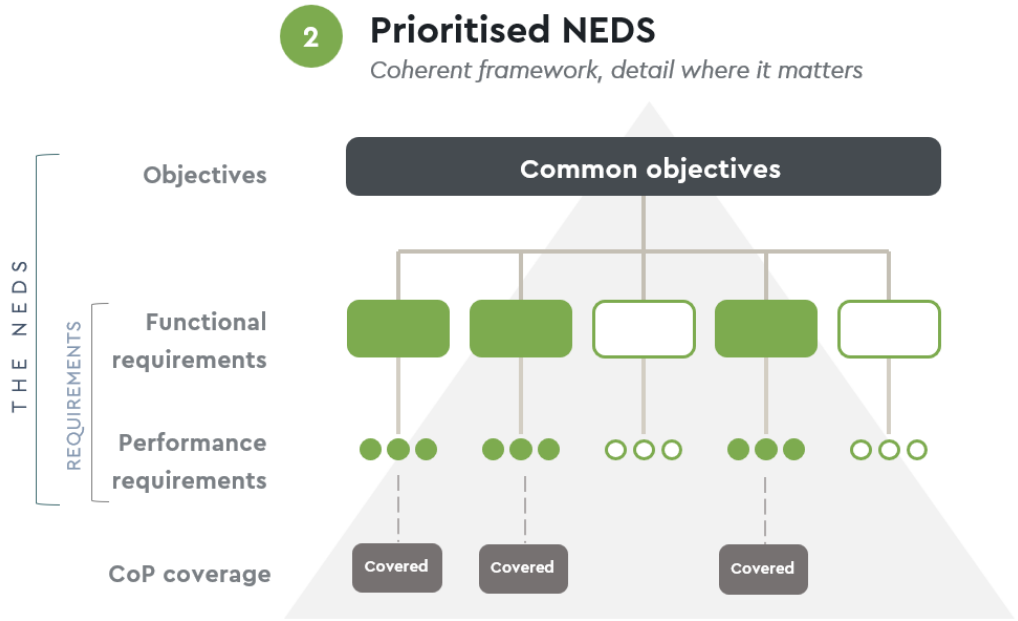
Establish the common framework, then develop priority areas first

A prioritised NEDS would establish common objectives across water supply, wastewater and stormwater from the outset. These would provide the organising framework for what all water services infrastructure must achieve.

The common objectives would then be translated into clear and assessable requirements. Detailed requirements would be developed first in priority areas. Recognised Code pathways would be developed alongside those requirements where a national compliance pathway would produce material benefits.

This option prioritises coherence and manageability. It establishes the overall NEDS framework from day one but avoids requiring every possible detailed requirement and Code pathway to be developed upfront.

Figure 9: Option 2 overview



How this option resolves the design choices

1. Objective framework

Common high-level objectives apply across the three waters. This establishes a coherent performance framework for NEDS, while still allowing objectives to be translated into requirements that clearly define their own scope, including the relevant water service.

2. Application of requirements

Requirements can apply selectively and proportionately based on the role and importance of infrastructure, where developed.

3. Specification of requirements

Requirements are clear and assessable, where developed. Each requirement would state what infrastructure must do, the benchmark for deciding whether that function has been

achieved, and the water service and specific infrastructure it applies to.

4. Initial ambition

The common objective framework and detailed requirements in priority areas are developed first, with Code pathways developed where justified. Further requirements and Code pathways are then added over time within that established framework.

How this option would work

The first edition would establish the common objectives that provide the overall performance framework for NEDS. This means the framework would begin with a clear view of the outcomes water services infrastructure is expected to support across water supply, wastewater and stormwater.

The WSA would then consider potential requirement areas across that framework and determine where detailed development should occur first. Priority would be given to areas where early national direction would make a material difference and clear national requirements can be developed now.

For each priority area, the WSA would develop clear and assessable requirements. Each requirement would define its own scope, including the relevant water service and, where needed, the infrastructure component, function, activity or lifecycle point it applies to. Each requirement would include a functional requirement and a performance requirement, so users can understand what the infrastructure must do and the benchmark for deciding whether that function has been achieved.

Those requirements could then apply proportionately, including by varying the performance requirement, evidence expectations or assurance pathway based on the role and importance of infrastructure.

The need for a recognised Code pathway would be considered alongside each priority area. Codes would be developed where standardising a practical means of compliance would materially reduce inconsistency, cost, delay or uncertainty.

Areas not developed in detail in the first edition would sit within the common framework and could be signalled for future development. This means NEDS can be expanded over time without the overall framework emerging in a piecemeal way.

Strengths

✓ **Establishes a coherent framework from the outset.** Common objectives provide a stable structure across water supply, wastewater and stormwater. This helps ensure detailed requirements developed over time are connected to the same overall performance framework.

✓ **Focuses effort where national direction adds most value.** Detailed development is directed to priority areas rather than spread evenly across the potential framework. This allows the WSA to focus technical work and sector engagement where early direction is most likely to improve consistency, certainty or performance.

✓ **Creates a more manageable development programme.** The WSA does not need to develop every potential requirement and Code pathway before the first edition is established. This reduces upfront development pressure while still providing a coherent national framework.

✓ **Supports coherent development over time.** Further requirements can be added within an established framework rather than the framework itself emerging piece by piece. This reduces the risk of fragmentation as NEDS expands.

Limitations

Θ **Does not provide full national direction immediately.** The first edition would establish the common framework, but detailed requirements and Code pathways would only be developed in priority areas.

This is not as acute as the targeted option, but users will still need to rely on local Codes, standards or existing practice in areas not yet developed.

- **Prioritisation requires clear choices.** The WSA needs a credible and transparent basis for deciding what is developed first.
- **Requires enough upfront framework development to avoid becoming abstract.** The common objectives need to be developed clearly enough to guide future requirements, even where detailed requirements are not yet included. If the common framework is too high-level, it may not provide enough structure to prevent later development becoming piecemeal.

Choose this option if...

The priority is to establish a coherent national framework while focusing detailed development where early national direction can add the most value.

This option combines the coherence of a common national performance framework with a focused and more manageable programme of detailed development.

It addresses more of the fragmentation NEDS is intended to resolve without requiring all potential requirements and Code pathways to be developed upfront.

We recommend this option. The preferred approach is developed in detail in the following section.

Option 3: Comprehensive NEDS

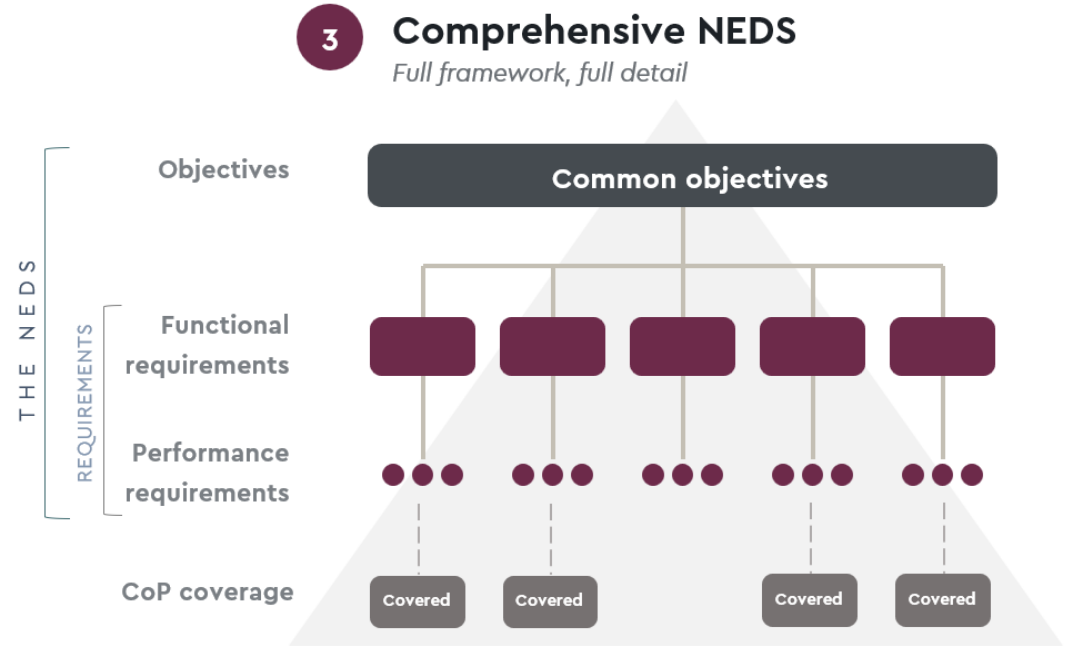
Establish the common framework and develop detailed requirements broadly upfront

A comprehensive NEDS would use the same basic architecture as the prioritised option. It would establish common objectives across all water services from the outset, and requirements would be clear, assessable and able to apply proportionately.

The key difference is the level of initial ambition. Instead of developing detailed requirements first in priority areas, this option would develop detailed requirements across most of the potential NEDS framework before the first edition is established. Recognised Code pathways would be developed where justified.

This option prioritises breadth and completeness. It would provide the most detailed national direction from day one but would require a much larger and longer upfront development programme.

Figure 10: Option 3 overview



How this option resolves the design choices

1. Objective framework

Common high-level objectives apply across the three waters. As with the preferred option, these objectives provide the overall structure for NEDS, with detailed requirements developed beneath them.

2. Application of requirements

Requirements can apply selectively and proportionately based on the role and importance of infrastructure.

3. Specification of requirements

Requirements are clear and assessable.

4. Initial ambition

Detailed requirements are developed broadly across most potential areas upfront, with Code pathways developed where justified.

How this option would work

The WSA would establish the common objectives and undertake detailed requirement development across most of the potential NEDS framework before issuing the first edition.

For each area, the WSA would need to determine which infrastructure types requirements apply to, the required level of performance, how compliance can be assessed and whether a recognised Code pathway should also be developed.

This option would produce a more complete first edition. However, it would require detailed technical work across areas that may not yet have the same level of urgency, readiness or sector consensus.

Strengths

✓ **Provides the broadest national direction from the outset.** Once in force, this would reduce reliance on local Codes across a much wider range of areas than the targeted or prioritised options.

✓ **Leaves fewer areas for later development.** The first edition would be closer to a mature NEDS framework, with less reliance on future work programmes to fill major gaps.

✓ **Provides greater visibility of national expectations.** WSPs, designers, developers and contractors would have greater visibility of detailed requirements across the framework from the first edition.

✓ **May reduce transition complexity over the long term.** A broader first edition could reduce the need for repeated rounds of change as new requirement areas are added later.

Limitations

Θ **Requires a much larger development programme.** Developing clear and assessable requirements broadly across the framework would require substantial technical work, testing, consultation and WSA capacity before the first edition could be issued.

Θ **Would take longer to establish.** The scale of upfront development is likely to delay the first edition, including requirements and Code pathways in areas where early national direction is most needed.

Θ **Risks developing detail before the case or technical approach is settled.** Some areas may have a weaker case for early national direction, limited evidence of current problems, or less mature technical practice. Developing detailed requirements too early could result in requirements that need significant revision.

Θ **May use WSA capacity where early intervention adds less value.** WSA and sector effort would be spread across most of the framework, rather than concentrated on areas where national direction would make the greatest immediate difference.

Θ **High implementation burden.** A broad first edition would require WSPs, developers, designers and contractors to understand and implement a large set of new requirements at once. This may be difficult during a period of wider water sector reform.

Choose this option if...

Broad and detailed national direction is needed from the outset and the WSA has the time and capacity for a substantial upfront development programme.

This option would provide the most comprehensive first edition. However, compared with the prioritised option, the main benefit is additional breadth upfront. That benefit is unlikely to justify the likely delay, development burden and risk of premature detail in areas where the case or technical approach is less settled.

We **do not recommend** this option.

Assessment of the options

We assessed the options against six criteria

We undertook a preliminary assessment of the options to test how well they address the problems NEDS is intended to resolve and the practical implications of implementation.

The assessment is necessarily high level at this stage. Detailed performance requirements and thresholds have not yet been set, and these decisions will materially affect the costs, benefits and regulatory impacts of NEDS. The assessment therefore focuses on the likely effects of the overall regulatory approach. The detailed assessment is provided in Appendix 4.

We assessed the options against six criteria, outlined in Table 5.

Table 5: Options assessment criteria

Criterion	What we considered
Consistency	Whether the option reduces fragmentation and creates a more consistent national approach.
Clarity	Whether users can understand the performance expected and what is needed to comply, while retaining flexibility for different solutions.
Cost efficiency and financial sustainability	Whether the option can reduce duplication, approval delays and lifecycle costs and support more efficient project delivery.
Regulatory effectiveness	Whether the option provides a clear, proportionate and enforceable basis for compliance, monitoring and enforcement.
Reliability and resilience	Whether the option supports infrastructure to perform reliably and withstand or respond to disruption, supporting public health, safety and environmental protection.
Implementation and transition	Whether the option can be developed and introduced in a practical and timely way, including for existing infrastructure.

The assessment includes the status quo and a deregulatory option

In addition to the three NEDS options explained in the previous section, we assessed the status quo as the counterfactual and a deregulatory option.

Under the status quo, NEDS would not be established. Water service providers and councils would continue to rely on local engineering codes and requirements. Consolidation of water service providers may reduce the number of codes over time, but a fragmented local approach would remain.

Under the deregulatory option, existing local engineering codes would be removed and no NEDS established. There is no current mechanism to do this, so legislative change would be required. In broad terms, infrastructure performance would no longer be supported by ex-ante engineering design requirements under this framework, with greater reliance on other legal and regulatory consequences where poor performance causes harm.

Table 6: Options assessment summary

Criterion	Status quo	Deregulatory	1: Targeted NEDS	2: Prioritised NEDS	3: Comprehensive NEDS
Consistency	**0** Local fragmentation continues	**–** Likely greater inconsistency without common engineering requirements	**+** National direction grows, but area by area	**++** Common framework strongly supports national consistency	**++** Broad national requirements strongly support consistency
Clarity	**0** Local codes provide direction, but differ	**–** Less clarity on what good infrastructure performance looks like	**+** Clear requirements in selected areas only	**++** Clear requirements developed within a coherent framework	**++** Clear requirements broadly across the framework, once developed
Cost efficiency and financial sustainability	**0** Existing duplication and local variation continue	**––** Greater duplication, uncertainty and approval effort	**+** Benefits are partial because local variation continues outside targeted areas	**++** Targets these benefits where national direction can add most value	**+** Broad potential benefits, but delayed and offset by a larger upfront development burden
Regulatory effectiveness	**0** Existing arrangements continue	**–** Greater reliance on responding after infrastructure fails or causes harm	**+** Provides a stronger regulatory basis, but only in selected areas	**++** Coherent, proportionate framework with strategically prioritised requirements	**+** Strong framework, but benefits are delayed by the scale of development
Reliability and resilience	**0** Existing requirements and outcomes continue	**–** Weaker ex ante direction on infrastructure performance	**+** Supports improved performance as selected areas are developed	**++** Enables priority reliability and resilience issues to be addressed earlier	**+** Broad coverage, but performance benefits take longer to realise
Implementation and transition	**0** No change required	**+** Quick to remove existing requirements, but leaves a significant direction gap	**+** Faster to establish, but develops piecemeal	**++** Best balance of framework coverage and timely benefits	**+** Large development programme delays implementation and benefits
Overall assessment	**0**	**– – – – –**	**+ + + + +**	**+ + + + + + + + + + +**	**+ + + + + + +**

The prioritised NEDS performs strongest overall

Table 6 summarises the assessment. The status quo is scored 0 as the counterfactual. A '+' indicates better performance than the status quo and a '–' indicates worse performance. Double signs indicate a stronger positive or negative effect.

A national NEDS framework performs materially better than the alternatives

The assessment supports the case for establishing NEDS. The status quo does not resolve the fragmented local approach that the regime is intended to address. Local codes may provide clarity within individual jurisdictions, but they retain duplication and variation and limit the benefits of a national system.

The deregulatory option performs worst overall. Its main advantage is speed: removing existing requirements could be implemented more quickly than developing a new national framework. However, speed is achieved by removing rather than improving ex-ante direction on infrastructure performance. This is likely to increase inconsistency and uncertainty and provide a weaker basis for supporting reliable, resilient and long-performing infrastructure. The assessment scores this option negatively overall.

The key trade-off is how quickly to build out the national framework

All three NEDS options perform positively against the status quo. Each has the potential to reduce duplication and local variation, provide clearer national expectations and establish a stronger basis for performance-based regulation.

The main difference is how the framework is established and how quickly detailed requirements are developed.

The targeted NEDS has the advantage of speed. Detailed national direction could be developed relatively quickly for a small number of selected areas. However, national consistency and regulatory benefits would emerge more gradually, and the framework risks developing in a piecemeal way.

The comprehensive NEDS provides the greatest breadth of national direction. However, developing clear and assessable requirements broadly across the framework would be a substantial undertaking. The time required before the first edition is established delays the consistency, regulatory and reliability benefits the framework is intended to produce.

The prioritised NEDS provides the best balance

The prioritised NEDS performs strongest across all six criteria. It establishes the common performance framework needed to support national consistency and clarity, while focusing detailed development where national direction is expected to add the greatest value and the technical basis is ready.

This is important because the benefits of NEDS do not depend only on how comprehensive the first edition is. They also depend on how soon useful requirements are in place and whether the WSA's development effort is directed to the areas where national intervention will make the greatest difference.

The prioritised approach therefore avoids the main weaknesses at either end of the spectrum. It does not build NEDS piece by piece without a common framework, and it does not delay the regime while attempting to develop most potential requirements upfront.

We recommend the prioritised NEDS (option 2). It provides the best balance of national consistency, regulatory effectiveness and timely benefits, within a manageable programme of detailed development.

The next section develops the recommended option in more detail, showing how a prioritised NEDS would work in practice.

The preferred NEDS framework

A common framework, applied proportionately and developed first in priority areas

As described in the previous section of this report (Options for the initial NEDS framework), this approach would establish a common performance framework across water supply, wastewater and stormwater from the outset, while developing detailed requirements and recognised Code pathways first in priority areas.

The preferred approach performed best in the options assessment and adequately balances the key trade-offs identified earlier in the report.

Table 7 summarises how the preferred approach resolves the design choices discussed in the previous section. Figure 11 below shows how these choices come together in the preferred NEDS framework.

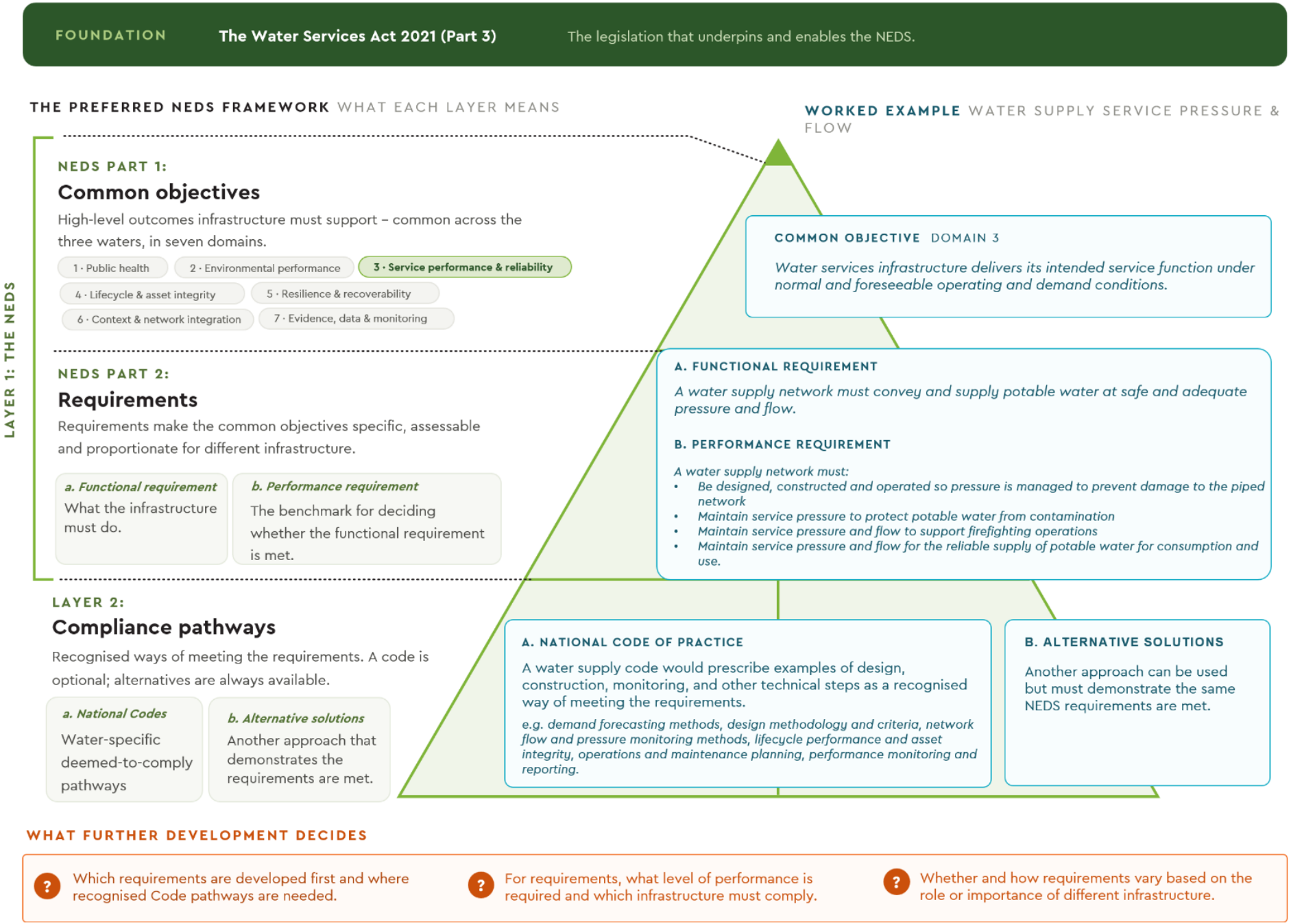
This section explains how the preferred framework would operate in practice. It covers:

1. **Common performance framework:** how NEDS sets common objectives for water supply, wastewater and stormwater infrastructure.
2. **Clear and assessable requirements:** how common objectives are translated into requirements for specific infrastructure.
3. **Proportionate application and classification:** how requirements can vary based on the role and importance of infrastructure.
4. **Codes of Practice and alternative solutions:** how users can demonstrate that NEDS requirements have been met.
5. **Prioritising and implementing the first edition:** how detailed requirements and Code pathways should be developed first in priority areas, then built out over time.

Table 7: How the preferred option resolves the design choices

Design choice	Preferred approach	What this means
1 **Objective framework**	*Common objectives across the three waters*	NEDS starts with a shared set of high-level objectives for drinking water, wastewater and stormwater infrastructure.
2 **Application of requirements**	*Selective and proportionate application*	Not every objective will translate into requirements for every part of the network. Requirements can vary based on the role and importance of infrastructure.
3 **Specification of requirements**	*Clear and assessable requirements*	Requirements should state what infrastructure must do and provide a clear basis for assessing whether the requirement has been met.
4 **Initial ambition**	*Prioritised development*	The first edition should establish the common framework, then develop detailed requirements and Code pathways first where national direction will add the most value and the technical basis is ready.

Figure 11: The preferred approach



Common performance framework

The preferred approach would establish a common performance framework across water supply, wastewater and stormwater

The preferred approach would establish one common performance framework across water supply, wastewater and stormwater. This means that the first edition of NEDS would start with a clear, common structure for what water services infrastructure is expected to support.

That structure has three parts:

1. **Performance domains:** the broad areas of infrastructure performance that NEDS addresses
2. **Common objectives:** the high-level outcomes sought for all water services infrastructure, within each domain
3. **Requirements:** the functional requirements and performance requirements that make the common objectives specific, assessable and proportionate for particular water services and infrastructure types.

Table 8: Recommended performance domains and common objectives

Performance domain	Common objective
1 Public health	Infrastructure protects public health and safety by managing infrastructure-related pathways to harm, including contamination, unsafe overflows, loss of service, and uncontrolled failure modes.
2 Environmental protection and performance	Infrastructure supports environmental outcomes by managing the infrastructure pathways that affect overflows, leakage, discharges, runoff, treatment performance and receiving environments.
3 Service performance, capacity and reliability	Infrastructure delivers its intended service function under normal and foreseeable operating and demand conditions.
4 Lifecycle performance and asset integrity	Infrastructure retains its required performance over its intended life, including through durability, maintainability, operability, renewability and asset integrity.
5 Resilience and recoverability	Infrastructure can withstand, adapt to, recover from, or safely fail under defined shocks and long-term stresses, including natural hazards, climate-related pressures and other disruption events.
6 Context suitability and network integration	Infrastructure is suitable for its site and network context and can be constructed, connected, commissioned, vested and integrated in a way that supports required network performance.
7 Performance evidence, asset data and monitoring	Performance can be demonstrated, recorded, monitored and improved through consistent evidence, asset data, commissioning information and monitoring requirements.

This hierarchy is important. The domains provide the organising structure for NEDS. The common objectives explain the outcomes sought across water services infrastructure. Requirements then make those objectives operational by setting what particular infrastructure must do and the

benchmark for deciding whether that function has been achieved. Each requirement would define its own scope. In most cases, this will include the relevant water service and, where needed, the infrastructure component, function, activity or lifecycle point the requirement applies to.

Performance domains provide common objectives across water services

We recommend that NEDS is organised around six substantive performance domains and one enabling assurance domain, summarised in Table 8.

The six substantive domains identify the main areas of infrastructure performance that NEDS should address. Within each domain, NEDS would set a common objective across water supply, wastewater and stormwater. Those objectives would then guide the development of detailed requirements.

The seventh domain, performance evidence, asset data and monitoring does not describe an infrastructure performance outcome in the same way as the other six domains. Instead, it supports the framework by ensuring performance can be demonstrated, recorded, monitored and improved over time. It also provides for requirements covering the use of common asset data standards.

The domains were workshopped with the WSA, and developed by considering:

- The statutory purposes of NEDS
- Previous NEDS work, including NTU drafts
- International comparator regimes
- Technical advice from GHD and SMEs about what water services infrastructure needs to achieve
- The design principles for the framework.

The domains and the common objectives within them are intended to be:

- **Outcome-focused,** describing what infrastructure must achieve, not how it must be designed
- **Within NEDS scope,** focusing on infrastructure performance, not every broader water system outcome
- **Broad enough for national application,** working across water supply, wastewater and stormwater
- **Specific enough to guide requirements,** so the objectives can be translated into functional requirements and performance requirements for the relevant water service, and specific infrastructure or lifecycle activity.
- **Stable over time,** so detailed thresholds, methods and evidence expectations can change without unsettling the whole framework
- **Distinct but connected,** avoiding unnecessary overlap while recognising that some requirements may support more than one domain.

This section now explains each performance domain, including the associated common objective, what the domain covers, why it matters and potential requirement areas within that domain.

Domain 1: Public health

Common objective: *Infrastructure protects public health and safety by managing infrastructure-related pathways to harm, including contamination, unsafe overflows, loss of service, and uncontrolled failure modes.*

What it covers	This domain covers infrastructure performance that affects the risk of harm to public health, including contamination, unsafe overflows, unsafe exposure, loss of service and uncontrolled failure.
Why it matters	Public health protection is a core statutory purpose of NEDS and a central feature of the WSA's risk-based regulatory role. Poor infrastructure performance can create direct and serious risks for communities.
Scope and boundaries	NEDS should not restate drinking water quality standards, wastewater discharge limits, workplace health and safety duties or emergency management obligations. Its role is to set the infrastructure performance expectations that support public health outcomes.
Key considerations for detailed development	Requirements may need to be more specific where public health risks are clear, good practice is settled and inconsistent application would create unacceptable risk. The performance bar may also need to scale based on consequence, population affected, redundancy and network role.
Potential requirement areas	*Water supply* • Network integrity to reduce contamination pathways; • Pressure management where needed to prevent ingress; • Backflow prevention; • Cross-connection control; • Commissioning and disinfection before connection or return to service. *Wastewater* • Wastewater containment; • Control of unsafe overflows where human exposure is reasonably foreseeable; • Pump station and network fail-safe requirements where failure could create public health exposure. *Stormwater* • Public safety risks from stormwater infrastructure failure; • Hazardous flows, ponding or overland flow where these create immediate risk to people; • Control of contaminated stormwater exposure in areas of public contact where this is an infrastructure pathway.

Domain 2: Environmental protection and performance

Common objective: *Infrastructure supports environmental outcomes by managing the infrastructure performance that affects overflows, leakage, discharges, runoff, treatment performance and receiving environments.*

What it covers	This domain covers infrastructure performance that affects the volume, frequency, quality, location and timing of overflows, discharges, leakage and runoff.
Why it matters	Poor infrastructure performance can create environmental harm, including effects on waterways, ecosystems and receiving environments. This domain also has a clear link to Māori interests in kaitiakitanga, environmental protection and the health of water bodies.
Scope and boundaries	NEDS should not set receiving environment objectives, discharge permissions, consent conditions or regional planning requirements. Those matters sit in other regimes. NEDS should focus on the infrastructure performance expectations that support those outcomes.
Key considerations for detailed development	Requirements may need to be more demanding where environmental harm would be significant, cumulative, irreversible or culturally important. This domain will need to balance national consistency with local suitability, because rainfall, receiving environment sensitivity, groundwater, coastal exposure, topography and network capacity can materially affect the performance required. Some tangata whenua may have strong views on appropriate approaches within their rohe.
Potential requirement areas	*Water supply* • Infrastructure-related network discharges, such as flushing or draining, where within NEDS scope; • Avoidable water loss and leakage where this affects environmental performance or resource efficiency. *Wastewater* • Dry- and wet-weather overflow frequency, volume, location and duration; • Infiltration, inflow and exfiltration; • Wastewater containment and storage to reduce uncontrolled discharges. *Stormwater* • Runoff quantity and quality where affected by infrastructure design; • Sediment, gross pollutant and contaminant capture; • Stormwater treatment device performance; • Downstream hydrological and hydraulic effects.

Domain 3: Service performance, capacity and reliability

Common objective: *Infrastructure delivers its intended service function under normal and foreseeable operating and demand conditions.*

What it covers	This domain covers ordinary service delivery, including infrastructure capacity, reliability, functionality and foreseeable growth or demand.
Why it matters	Communities should be able to expect a minimum level of service from water services infrastructure. Growth and demand also need to be properly accounted for so that infrastructure does not underperform as networks change. All New Zealanders, including Māori, have a strong interest in service performance, capacity and reliability.
Scope and boundaries	This domain covers normal and foreseeable operating conditions. It does not cover performance during major shocks or disruption events, which sits under resilience and recoverability. It also does not cover whether infrastructure retains performance over its full intended life, which sits under lifecycle performance and asset integrity.
Key considerations for detailed development	Some requirements may justify nationally fixed minimums, especially where users should be able to expect a consistent service floor. Other requirements, particularly capacity, growth and demand-related requirements, may need national methods with local inputs. NEDS should set methods and minimum expectations without replacing water service providers' responsibilities for network planning, investment prioritisation and demand forecasting.
Potential requirement areas	*Water supply* • Pressure, flow and continuity under normal and foreseeable demand conditions; • Capacity for growth and demand; • Minimum flow or pressure at defined service points; • Controls, alarms or telemetry for ordinary service reliability. *Wastewater* • Dry-weather and wet-weather conveyance capacity; • Allowance for growth and future demand; pump station and network operating capacity; • Controls, alarms or telemetry for ordinary service reliability. *Stormwater* • Primary system capacity; • Secondary system capacity, including overland flow paths; • Allowance for growth and future demand; • Peak flow attenuation; • Downstream capacity effects.

Domain 4: Lifecycle performance and asset integrity

Common objective: *Infrastructure retains its required performance over its intended life, including through durability, maintainability, operability, renewability and asset integrity.*

What it covers	This domain covers design life, durability, material performance, corrosion resistance, maintainability, accessibility, renewability, operability and asset integrity.
Why it matters	Infrastructure that appears compliant at commissioning can still fail prematurely, be difficult to maintain or impose unnecessary renewal costs if lifecycle performance is not designed in from the start. This domain supports whole-of-life value and relates to kaitiakitanga, by helping ensure current decisions do not disadvantage future generations.
Scope and boundaries	NEDS should not replace broader asset management planning, renewal prioritisation or investment programming. Its role is to set expectations for infrastructure performance over the asset life.
Key considerations for detailed development	The central trade-off is upfront affordability versus whole-of-life value. Requirements should avoid incentivising assets that are cheap to build but expensive to maintain, difficult to renew or likely to fail early. At the same time, lifecycle requirements need to be proportionate, especially for lower-consequence infrastructure. Slow-manifesting risks may need particular attention because some failures will not be visible at commissioning.
Potential requirement areas	*Water supply* • Design life; • Material suitability and durability; • Corrosion resistance; • Maintainability and accessibility; • Asset integrity to manage leakage over asset life; • End-of-life decommissioning where this affects performance. *Wastewater* • Design life; material suitability and durability; • Corrosion resistance; • Maintainability and accessibility; • Structural and hydraulic integrity, including managing infiltration, inflow and exfiltration over asset life; • End-of-life decommissioning. *Stormwater* • Design life; material suitability and durability; • Maintainability and accessibility; • Structural and hydraulic integrity of conveyance, detention and treatment assets; • Maintainability of sediment and debris capture functions; • End-of-life decommissioning where relevant.

Domain 5: Resilience and recoverability

Common objective: *Infrastructure can withstand, adapt to, recover from, or safely fail under defined shocks and long-term stresses, including natural hazards, climate-related pressures and other disruption events.*

What it covers	This domain covers infrastructure performance under conditions beyond normal operation, including seismic events, flooding, storms, coastal hazards, drought, extended power outages, lifeline disruption and climate-related pressures.
Why it matters	Improving reliability and resilience is a statutory purpose of NEDS. Water services infrastructure is essential for emergency response and community recovery. The consequences of non-performance can extend beyond service disruption to public health, environmental harm, economic impact and community wellbeing, including for Māori communities.
Scope and boundaries	NEDS should not replace broader emergency management, business continuity, drought management or climate adaptation planning. Its role is to set the infrastructure capability those plans rely on.
Key considerations for detailed development	This domain has a strong link to proportionality. Uniform resilience requirements would likely be too costly for low-consequence infrastructure and too weak for critical infrastructure. Requirements should distinguish between maintaining service, restoring service, controlled failure and avoiding public health or environmental harm. NEDS should use nationally consistent methods and decision rules, while allowing defined local hazard and climate inputs.
Potential requirement areas	*Water supply* • Continuity of critical supply under defined disruption events; • Emergency potable water capability where network service is disrupted; • Redundancy, backup power, bypass or contingency capability for critical assets; • Planned recovery timeframes; • Controlled failure where service cannot be maintained. *Wastewater* • Performance under defined seismic, flood, storm or power outage events; • Containment and emergency storage; • Redundancy, backup, bypass or contingency capability for critical pump stations and conveyance assets; • Planned recovery timeframes; • Controlled failure to avoid public health or environmental harm. *Stormwater* • Performance under defined extreme rainfall, coastal inundation, flooding, land instability or climate stress events; • Safe conveyance and flood routing through primary and secondary systems; • Protection of critical overland flow functions; • Controlled failure and recovery expectations for high-consequence stormwater infrastructure.

Domain 6: Context suitability and network integration

Common objective: *Infrastructure is suitable for its site and network context and can be constructed, connected, commissioned, vested and integrated in a way that supports required network performance.*

What it covers	This domain covers whether infrastructure is suitable for local site conditions, can be built and verified as designed, and can connect to and be accepted into the public network without creating performance problems.
Why it matters	Technically sound infrastructure can fail to perform if site conditions are not accounted for, construction does not reflect the design, or connection to the receiving network creates capacity, maintenance or ownership problems. Some mana whenua may have strong views on appropriate approaches within their rohe, strengthening the importance of understanding context.
Scope and boundaries	NEDS should set the infrastructure performance expectations for connections, commissioning and vesting. Local bylaws may manage operational and administrative aspects of the connection process, such as timing, fees and approvals, but should not lower the performance bar established by NEDS.
Key considerations for detailed development	This domain sits at the centre of the trade-off between national consistency and legitimate local variation. Local physical and network conditions should be treated as defined inputs to a national method, not as a way to recreate local engineering standards. Requirements also need to be clear at key interfaces, including between new and existing assets, private development and public networks, and NEDS and local bylaws.

Potential requirement areas

Water supply

- Site suitability, including ground, groundwater, seismicity, corrosion and constructability;
- Material and design suitability for local conditions;
- Pressure zone and network configuration;
- Extraordinary users or demand characteristics;
- Developer-built infrastructure connecting to, or vesting into, WSP networks;
- Commissioning, testing and handover for network integration.

Wastewater

- Site suitability, including ground, groundwater, seismicity, corrosion and constructability;
- Trade waste or unusual flow characteristics;
- Downstream network capacity;
- Developer-built infrastructure connecting to, or vesting into, WSP networks;
- Commissioning, testing and handover for network integration.

Stormwater

- Site suitability, including rainfall, topography, groundwater, flood risk and constructability as defined inputs;
- Receiving network or catchment integration;
- Overland flow and downstream capacity interactions;
- Developer-built infrastructure connecting to, or vesting into, WSP networks;
- Commissioning, testing and handover for network integration.

Domain 7: Performance evidence, asset data and monitoring

Common objective: *Performance can be demonstrated, recorded, monitored and improved through consistent evidence, asset data, commissioning information and monitoring requirements.*

What it covers	This domain covers the information needed to demonstrate, record, monitor and improve infrastructure performance over time. It includes evidence, asset data, commissioning information, monitoring information and records of compliance decisions.
Why it matters	A performance-based framework depends on evidence. Requirements without a clear evidence pathway can allow theoretical compliance without reliable evidence of practical performance. Consistent evidence also supports system learning, Code updates, alternative solution assessment and national benchmarking.
Scope and boundaries	This domain is different from the other six. The first six domains describe what infrastructure must achieve. This domain describes how performance is demonstrated and improved. NEDS evidence requirements should also be designed to avoid unnecessary duplication with Commerce Commission information disclosure requirements.
Key considerations for detailed development	The main trade-off is assurance versus administrative burden. Evidence requirements need to be strong enough to support consistent assessment, monitoring and system learning, but excessive evidence, modelling or reporting requirements could increase cost and delay without improving outcomes. Evidence expectations should be scaled by factors such as importance, complexity, uncertainty and novelty.
Potential requirement areas	*Water supply* • Design evidence and modelling assumptions; • Demand and capacity assumptions; • Commissioning records; • As-built and handover information; • Operational pressure, flow and velocity monitoring where needed to demonstrate infrastructure performance; • Asset data, condition records, classification records and compliance decision records.
	Wastewater • Design evidence and modelling assumptions; • Flow and capacity assumptions; • Commissioning records; • As-built and handover information; • Operational flow, velocity, blockage and overflow monitoring where needed to demonstrate infrastructure performance; • Asset data, condition records, classification records and compliance decision records.
	Stormwater • Design evidence and modelling assumptions; • Rainfall, catchment and capacity inputs; • Commissioning records; • As-built and handover information; • Operational flow, blockage, overflow and flooding incident data where needed to demonstrate infrastructure performance; • Asset data, condition records, classification records and compliance decision records.

Potential domains requiring a judgment

Table 9: Performance domain options that are not recommended to be included

Matter	Why this isn't a performance domain	Recommended treatment
Economic and financial sustainability	Directly reflected in the statutory purpose and central to the current policy context. However, is a cross-cutting discipline for setting the performance bar, levels of service, classification logic and transition pathway, so NEDS improves infrastructure outcomes without imposing unjustified costs on providers, developers or ratepayers. This is also regulated through economic regulation set by the Commerce Commission – NEDS set the performance expectations and economic regulation is used to incentivise economically efficient delivery for consumers.	Treat as a design principle and calibration discipline. It should influence how performance bars, evidence burdens and transition pathways are set, particularly through the detailed development of specific performance requirements, rather than operating as a standalone infrastructure performance domain.
Māori rights and interests	Important to how public health, environmental, resilience and local-context outcomes are understood and applied. The WSA has statutory operating principles relating to trust with Māori, early and meaningful engagement, and enabling mātauranga Māori, tikanga Māori and kaitiakitanga. This applies across the whole regime, so is better treated as a cross-cutting principle.	Requires a decision from the WSA. Options include embedding relevant considerations across domains within requirements or creating a standalone domain. The preferred approach should recognise Māori rights and interests where they intersect with infrastructure performance, while remaining clear about the scope of NEDS.
Continuous improvement	Continuous improvement is mainly a regime mechanism, not a direct infrastructure-performance outcome. It is delivered through reviews, alternative solutions, data feedback, updated Codes and learning from performance evidence.	Treat as a system mechanism supported by performance evidence, asset data, monitoring, alternative solution feedback, Code updates, guidance and periodic review. The performance evidence domain provides the information base for this learning to occur.
Environmental footprint, including carbon, energy and materials	Including environmental footprint could support whole-of-life sustainability but may also increase compliance costs and create affordability trade-offs. It is already dealt with through other mechanisms. Its inclusion is likely a consideration for future editions of NEDS.	Requires a decision from the WSA. We considered treating it as a standalone domain, addressing it through Codes of Practice, or relying on other policy, procurement and planning mechanisms. If included in NEDS, the framework would need to be clear whether it is regulating infrastructure performance, construction practice, embodied emissions, operational energy use or material selection.

Source: MartinJenkins analysis

Turning objectives into clear and assessable requirements

The common performance framework sets the outcomes NEDS is concerned with. However, to be workable in practice, common objectives need to be translated into requirements that tell users what particular infrastructure must do and how compliance will be assessed.

Each requirement should define its own scope. This includes the relevant water service and, where needed, the infrastructure component, function, activity or lifecycle point it applies to.

To be clear and assessable, we recommend that each requirement has two parts:

1. **Functional requirement:** describes what infrastructure must do
2. **Performance requirement:** sets the benchmark for deciding whether the functional requirement has been met.

Together, these parts create a clear line from the common objectives to practical compliance decisions:

Performance domain → common objective → requirements (functional requirement & performance requirement) → compliance pathway

The objective explains the outcome sought at a high level. The requirement then applies that objective to a defined scope, usually by identifying the relevant water service and, where needed, the infrastructure component, function, activity or lifecycle point it applies to. Within each requirement, the functional requirement states what the infrastructure must do, and the performance requirement provides the benchmark for assessing whether that function has been achieved.

This section explains the core structure of a NEDS requirement and provides a worked example for water supply pressure and flow in Table 10. More detailed guidance on how objectives could be translated into detailed requirements is included in Appendix 2.

Requirements make the common framework usable

A common objective may apply across water supply, wastewater, and stormwater, but the requirements beneath it will need to be specific enough to be applied and assessed.

For example, a common objective may be that infrastructure delivers its intended service function under normal and foreseeable operating conditions. That objective does not itself tell users what a water supply storage facility, wastewater pump station or stormwater pipe must do. A requirement needs to define its scope, state the function the infrastructure must perform, and set the benchmark for deciding whether that function has been achieved.

Clear and assessable requirements give designers, developers, water service providers and the WSA a common basis for understanding what is required. This is particularly important for the alternative solutions pathway where solutions are assessed directly against the relevant requirements.

Requirements should be clear without prescribing the solution

A requirement can be clear and assessable without prescribing a single design or method.

For example, a requirement could set the level of performance that must be achieved, how that performance is measured and what evidence is needed to demonstrate compliance. That would provide a clear benchmark while still allowing different designs, technologies or approaches to meet it.

By contrast, a requirement that only states a broad aspiration, such as that infrastructure must be "durable" or "minimise loss", would leave too much room for interpretation. Different providers could reach different views about whether the

same infrastructure complies. This would carry existing inconsistency into the national framework.

The preferred approach is therefore to make requirements specific enough to support consistent compliance decisions, while leaving flexibility in how the required performance is achieved.

Detailed development will need to decide what each requirement contains

For each requirement, detailed development will need to determine:

1. What common objective(s) the requirement supports
2. The scope of the requirement, including the relevant water service and, where needed, the infrastructure, function, activity or lifecycle point it applies to
3. What function the infrastructure within the requirement's scope must perform (the functional requirement)
4. What performance benchmark must be met (set through the performance requirement)
5. Whether the performance benchmark is nationally fixed, based on local inputs, varied by classification, or a combination
6. How compliance can be demonstrated, including through a Code of Practice pathway.

These decisions will determine how each common objective is translated into practical expectations for different types of infrastructure.

The next section explains how those requirements can apply proportionately, including how requirements may vary based on the role and importance of infrastructure through classification.

This phase of work does not set the detailed performance bar

This report does not define the specific performance requirements, measures or thresholds that should be included in NEDS. Those decisions will need to be made through detailed technical development, testing and engagement.

That next phase will need to consider matters such as consequence of non-performance, infrastructure function, local conditions, lifecycle costs, affordability, resilience, reliability, Māori rights and interests, and the maturity of existing practice.

The role of this report is to establish the framework for making those decisions, not to set the final values. Appendix 3 provides more detailed material to support that next phase of development.

Table 10: Worked example – Water supply service Pressure and Flow in the drinking water network from the treatment plant to the point of supply.

Layer	Contents	Comment
Domain	Service performance, capacity and reliability	This is the overall performance domain topic.
Common objective	The objective of this standard is to ensure that water services infrastructure delivers its intended service function under normal and foreseeable operating and demand conditions	This is the common objective that applies across water supply, wastewater, and stormwater.
Functional requirement	A water supply network must convey and supply potable water at safe and adequate pressure and flow	The function the water supply infrastructure must perform to give effect to the performance objective. This is one functional requirement within the relevant scope. There may be others: for example, within this scope we anticipate that there could also be requirements related to matters such as water demand, and water loss.
Performance requirement	A water supply network must: • be designed, constructed and operated so pressure is managed to prevent damage to the piped network • maintain service pressure to protect potable water from contamination • maintain service pressure and flow to support firefighting operations • maintain service pressure and flow for the reliable supply of potable water for consumption and use.	These define the specific elements of performance required to meet the functional requirements. To be effective and to provide for national consistency, the requirements need to be clear and provide a basis for the assessment of performance that would be demonstrated through the methodologies and content of associated codes or alternative solutions. Some elements of performance may need to include thresholds or service levels. A performance requirement should provide an objective basis for determining compliance and approval of infrastructure and enabling consistent interpretation and application across the sector.
National Codes of Practice	National Codes could specify how these requirements will be met, this could include both methodologies and/or quantitative criteria. Including:	Examples of the design, construction, monitoring, testing or other technical steps a Code could specify as a recognised way of meeting the NEDS requirement.

	• Demand forecasting methods • Design methodology and criteria • Network flow and pressure monitoring methods • Asset condition assessments and maintenance planning.	They set out nationally acceptable steps and approaches that, if followed, can be used to achieve and demonstrate compliance with the performance requirements.
Alternative Solutions	A provider using an alternative approach could demonstrate that the pressure and flow performance requirements are met through a combination of monitoring data, modelling and performance reporting and independent assurance of design. Evidence could include flow and pressure data, operational performance over time, asset condition and criticality information, long-term performance trends, product testing data and pressure management.	What a provider using a different approach to the Codes of Practice would need to demonstrate to show that the functional requirement and performance requirement had been met.

Source: GHD and MartinJenkins

Applying requirements proportionately

The previous section explained how common objectives are translated into clear and assessable requirements. The next key question is how those requirements should apply to different infrastructure.

Under the preferred approach, NEDS requirements should apply selectively and proportionately. This means the same requirement does not need to apply to every part of the network in the same way.

This is important because different parts of a network perform different roles and create different consequences if they fail or underperform. A minor local connection, a trunk main serving a large population, a pump station serving a hospital, and a major discharge point should not necessarily face the same performance or evidence expectations.

A proportionate framework allows NEDS to be more demanding where consequences of non-performance are higher, while avoiding unnecessary cost and burden where consequences are lower.

Proportionality applies to NEDS requirements as a whole. However, in most cases, the functional requirement should remain relatively stable because it describes the function the infrastructure must perform. Proportionality will usually be applied through the performance requirement, evidence expectations or scope of application (whether a requirement applies at all).

More detailed considerations and options for designing a proportionate framework are set out in Appendix 3.

Proportionality can be built into requirements in different ways

Proportionality can be built into requirements through a range of mechanisms. These mechanisms do different jobs and can be used alone or in combination, depending on the requirement.

Scope-based application

Defines the infrastructure, activity or lifecycle point the requirement applies to. For example, a requirement may apply to new wastewater pump stations, but not to gravity wastewater pipes or existing pump stations unless they are being renewed or upgraded.

This is appropriate where a requirement is only relevant to particular infrastructure or circumstances.

What do we mean by proportionality?

Proportionality means the regulatory response should match the problem.

New Zealand's *Government Expectations for Good Regulatory Practice* state that regulatory systems should be "proportionate, fair and equitable" and should seek to achieve their objectives in a least-cost way.

For NEDS, this means the level of control should match the infrastructure performance issue being managed. Where non-performance could cause serious harm, disruption or cost, the requirement may need to be stronger. Where the consequences of non-performance are lower, the requirement, evidence or assurance should not be heavier than needed to achieve the objective.

Source: New Zealand Government, Government Expectations for Good Regulatory Practice (April 2017)

National method with local inputs

Sets a consistent national method but uses defined local inputs to determine the performance requirement benchmark. For example, a stormwater capacity requirement may use a national method, with local rainfall intensity, catchment characteristics and downstream network constraints as inputs.

This is appropriate where local physical, climatic, geological, environmental or network conditions genuinely affect the performance required.

Requirement-specific calibration

Builds proportionality directly into the requirement by explicitly setting different performance benchmarks or evidence expectations for defined circumstances. For example, a durability requirement may set different evidence expectations for buried pipes, above-ground assets and assets exposed to corrosive environments.

This is appropriate where the relevant differences are highly specific to that requirement and can be defined within it.

Classification-based scaling

Uses infrastructure classification to vary the requirement, performance level, or evidence burden based on role and importance. For example, a resilience requirement may apply to all pump stations, but higher-class pump stations may need to meet stronger recovery, redundancy or evidence expectations.

This is appropriate where the consequence of non-performance differs across infrastructure and a consistent framework-wide basis for scaling is needed.

The rest of this section focuses on classification as the main cross-framework mechanism for applying proportionality consistently. The other mechanisms can be applied through the drafting of individual requirements. Classification needs a clearer overarching method so that similar infrastructure is treated consistently across requirements and across the country.

Classification provides a consistent basis for scaling requirements

Classification is one way to make proportionality practical.

It groups infrastructure based on its role and importance in the network, so that performance levels and evidence expectations scale consistently.

Classification should focus on the consequences of non-performance

We recommend that classification should focus on the consequence of non-performance. For NEDS, the key question is what would happen if the infrastructure did not perform as required.

Relevant factors may include:

- The function the infrastructure performs
- The population, critical users or communities affected by non-performance
- Whether there is redundancy or an alternative pathway for the function
- The duration and difficulty of repair or recovery
- The severity of potential public health, environmental, service, cultural or economic impacts
- The sensitivity of the receiving environment or affected community.

This recognises that the same type of asset can have different significance in different contexts. For example, two pipes of the same size may have very different consequences if one serves a small local catchment with redundancy and the other is the only supply route to a large population or critical facility.

Classification should support, not replace, detailed requirement development

Classification should not determine everything on its own. It should sit alongside the requirement itself.

For each requirement, the WSA will still need to decide:

- What infrastructure the requirement applies to

- Whether classification is relevant to that requirement
- What changes at each class, if anything
- Whether the change is to the performance level, evidence burden, or scope of application.

This means classification is a tool for applying requirements proportionately. It is not a substitute for carefully drafting the requirement.

Classification can also support the scope of the first edition

Classification can help the WSA define the detailed scope of the first edition of NEDS.

The first edition does not need to develop detailed requirements and Code pathways for every type of infrastructure. Some infrastructure may be high-consequence, technically complex, or strongly dependent on site-specific engineering judgement. For those areas, it may be more appropriate to identify them as outside the detailed scope of the first edition, with bespoke requirements developed later.

For example, if reservoirs or treatment plants are outside the intended scope of the first edition, the framework should say this clearly. The rationale should not be that they are

Table 11: Indicative class structure and triggers

Class	Indicative triggers
Class 5: Very high importance	Applies if any of the following triggers are met: • Failure would affect more than [x] people with no effective redundancy, or more than [x] people with partial redundancy. • The functional component is the sole or primary supply route to [hospitals, emergency services, civil defence welfare centres]. • Failure would cause overflow or discharge to [a shellfish harvesting area, nationally significant ecological or cultural site]. • The component is critical backbone infrastructure whose failure would disable another Class 5 component. • The component is the sole water supply to an isolated or remote community with no practicable alternative supply, regardless of population size.
Class 4: High importance	Applies if any of the following triggers are met, and no Class 5 trigger applies: • Failure would affect more than [x] people with no redundancy, or more than [x] people with only partial redundancy. • The functional component is a rising main, pressure main or trunk sewer with no bypass, where failure would result in immediate uncontrolled overflow or loss of conveyance. • The functional component serves critical users but is not their sole supply. • Repair or recovery following failure would exceed [x] days. • Failure would directly affect [a swimming beach, high-sensitivity receiving waterway or other significant environmental asset]. • The component is major stormwater conveyance or detention infrastructure whose failure would cause flooding to more than [x] properties or inundation of a critical facility.
Class 3: Moderate importance	Applies if any of the following triggers are met, and no Class 4 or 5 trigger applies: • Failure would affect more than [x] people with no redundancy, or more than [x] people with partial redundancy. • Repair or recovery would take more than [x] days. • Failure would affect [a moderately sensitive receiving environment]. • The component is stormwater infrastructure whose failure would cause flooding to more than [x] properties or disrupt a significant transport corridor.
Class 2: Low importance	Applies if any of the following triggers are met, and no higher trigger applies: • Failure would affect more than [x] people with partial redundancy available. • Repair or recovery would take more than [x] days. • The component is stormwater infrastructure whose failure would cause flooding to more than [x] properties.
Class 1: Very low importance	Applies where no higher trigger applies, including where: • Failure would affect fewer than [x] people with full redundancy available. • Repair or recovery would occur within [x] hours. • The component is stormwater infrastructure serving a small catchment with limited downstream consequence.

unimportant. It should be that they are high-consequence, complex, or better addressed through separate other regulatory tools before detailed NEDS requirements or Code pathways are set.

This gives the WSA a defensible basis for staging. The first edition can remain coherent and manageable, while signalling how the framework may be built out over time.

Illustrative classification structure

Table 11 shows how classification could work. It is illustrative only. The final classes, triggers and thresholds would need to be developed through detailed technical work and sector testing.

Further work is needed to design the classification method

This report does not settle the final classification approach. Further work will be needed to decide:

- How many classes are needed
- What triggers or thresholds should apply
- How classification applies to new infrastructure, renewals, upgrades and existing assets
- What changes at each class for each requirement.

The key point for the preferred framework is that NEDS should include a clear mechanism for proportionate application. Without that mechanism, NEDS risks either imposing unnecessary requirements on lower-consequence infrastructure or setting too low a bar for infrastructure that is critical to network performance.

More detailed considerations for designing a classification framework are set out in Appendix 3.

National codes of practice and alternative solutions as compliance pathways

The previous sections explained how NEDS requirements would be developed and applied proportionately under the preferred approach. This section explains how users would demonstrate compliance with those requirements.

Under the preferred approach, NEDS would remain the mandatory layer. National Codes of Practice and alternative solutions would sit beneath NEDS as available compliance pathways.

A Code of Practice would provide a recognised way of meeting one or more NEDS requirements. Alternative solutions would be developed where there is no Code or where a different approach to that in the Code can demonstrate that the same NEDS requirements are met.

This section covers:

- The role of Codes and how they relate to NEDS requirements
- The scope and content Codes should cover
- How Codes should be organised
- The right level of prescription for Codes
- How alternative solutions and verification should work.

National Codes of Practice versus existing local Codes

National Codes of Practice will differ from existing local Codes, in that:

- They are an optional approach to meeting the new compulsory performance requirements in the NEDS.
- They will cover the full lifecycle, design, construction, operation, repair, renewal, maintenance and decommissioning. Existing local Codes typically only focus on design and construction, approval and vesting.

GHD has assessed the alignment of existing Codes against the proposed performance domains for the NEDS and found that while they generally align with outcomes such as public health, environmental protection, service performance and basic asset integrity, they are not formally aligned with a performance-based framework and are mostly used as prescriptive design standards.

The main gaps are in resilience, and performance evidence, data and monitoring, with mixed coverage on lifecycle performance and asset integrity.

The role of Codes of Practice

Codes provide recognised pathways to compliance

Section 97I of the Water Services Act provides for national Codes of Practice. Codes support implementation of NEDS by providing a recognised pathway for demonstrating compliance.

A NEDS requirement states what infrastructure must do and the benchmark that must be met. A Code shows one accepted way of meeting that requirement. It may include technical specifications, standards, methods, processes, drawings, testing requirements, commissioning steps or evidence expectations.

This gives users a clearer answer to the practical question: what do I need to do to comply?

A Code should provide enough detail for designers, developers, contractors and water service providers to apply it confidently. It should also provide enough assurance for water service providers and the WSA to know that following the Code will meet the relevant NEDS requirement.

Codes must be anchored to NEDS requirements

Codes do not replace NEDS requirements. They sit beneath them.

This matters because alternative solutions must remain available. If a Code becomes the only practical way to comply, the framework would lose much of the flexibility intended by a performance-based regime.

A Code should clearly identify:

- The NEDS requirement or requirements it relates to
- The water service network it applies to
- The infrastructure, activity or lifecycle point it covers
- Any classification, local input or circumstance that affects its application
- The evidence needed to demonstrate that the Code pathway has been followed.

Codes may cover matters across the infrastructure lifecycle, including design, construction, operational performance, connection, vesting, repair, upgrade, renewal, maintenance, decommissioning and information requirements.

Codes should be developed where they add practical value

Not every NEDS requirement will need a Code pathway.

A Code is most useful where a recognised national pathway would reduce inconsistency, cost, delay or uncertainty, and where the technical approach is sufficiently settled and repeatable to standardise.

Codes are likely to add the greatest value where:

- The same type of infrastructure or activity occurs frequently across the country
- Current local variation is causing avoidable cost, redesign, approval disputes or uncertainty
- Users need a clear pathway for connection, vesting, commissioning or acceptance
- There is a settled technical method that can be standardised
- A code would support smaller water service providers, developers or practitioners who do not have the capacity to develop bespoke evidence packages each time.

Codes may add less value where infrastructure is highly bespoke, higher-consequence, strongly site-specific or dependent on complex engineering judgement. In those cases, the NEDS requirement may still be needed, but a detailed Code pathway may need to be developed later, be more limited, or allow greater scope for project-specific assessment.

The next preferred option section considers how the WSA should prioritise which requirements and Code pathways are developed first.

The scope and content of Codes of Practice

Codes may cover matters across the infrastructure lifecycle, including:

- Design, construction and operational performance
- Connection to a water services network
- Infrastructure proposed to be vested in a water service provider
- Repair, upgrade, renewal, maintenance and decommissioning
- Collection, management and sharing of information relating to infrastructure performance.

Codes should be designed as a practical compliance tool. They should help users understand what applies, what pathway they are following, and what evidence is needed.

Codes should focus on the core risks and intended outcomes, using referenced standards

Table 12: High-level content of Codes of Practice

Code element	Purpose
Purpose and scope	Defines what the Code covers, who it applies to, and which water service, infrastructure, activity or lifecycle point is in scope.
Link to NEDS requirements	Identifies the functional requirements and performance requirements the Code pathway is intended to meet.
Design and engineering pathway	Sets out the accepted method, process, standard, specification, drawing, design input or calculation approach.
Lifecycle requirements	Covers relevant lifecycle points, including design, construction, commissioning, operation, renewal, maintenance and decommissioning where relevant.
Compliance and evidence requirements	Specifies the documents, calculations, modelling, tests, commissioning records, asset data or certificates needed to demonstrate compliance.
Review and assurance process	Identifies when internal review, peer review, independent review or additional assurance is required.
Interfaces with other regimes	Explains relevant interfaces with bylaws, connection and vesting processes, planning instruments, environmental approvals, asset management and emergency management.
Data and metadata requirements	Links to asset data, as-built, GIS, condition, performance and handover information requirements.
Updating mechanism	Provides for version control, feedback loops and updates as practice, evidence and alternative solution decisions evolve.

for technical detail where those standards already exist and are suitable.

Table 12 provides an overview of what each water-specific Code should cover at a high level.

Codes should specify how compliance is demonstrated

Because Codes provide a recognised compliance pathway, they need to be clear about what a user must provide to show the pathway has been followed.

This is likely to include a combination of:

- Design documents
- Supporting calculations and modelling
- Compliance statements
- Asset and data deliverables
- Designer certification
- Internal, peer or independent review where required
- Construction testing
- Commissioning and handover records
- Operational interface information.

The Code should also identify the lifecycle checkpoints where evidence is required, such as design, construction, commissioning, handover and operation interface.

In practice, the Code should create a proportionate "deemed-to-comply" pathway: standard documentation and review for standard situations, with stronger evidence or verification where risk, complexity or consequence justifies it.

The structure of Codes of Practice

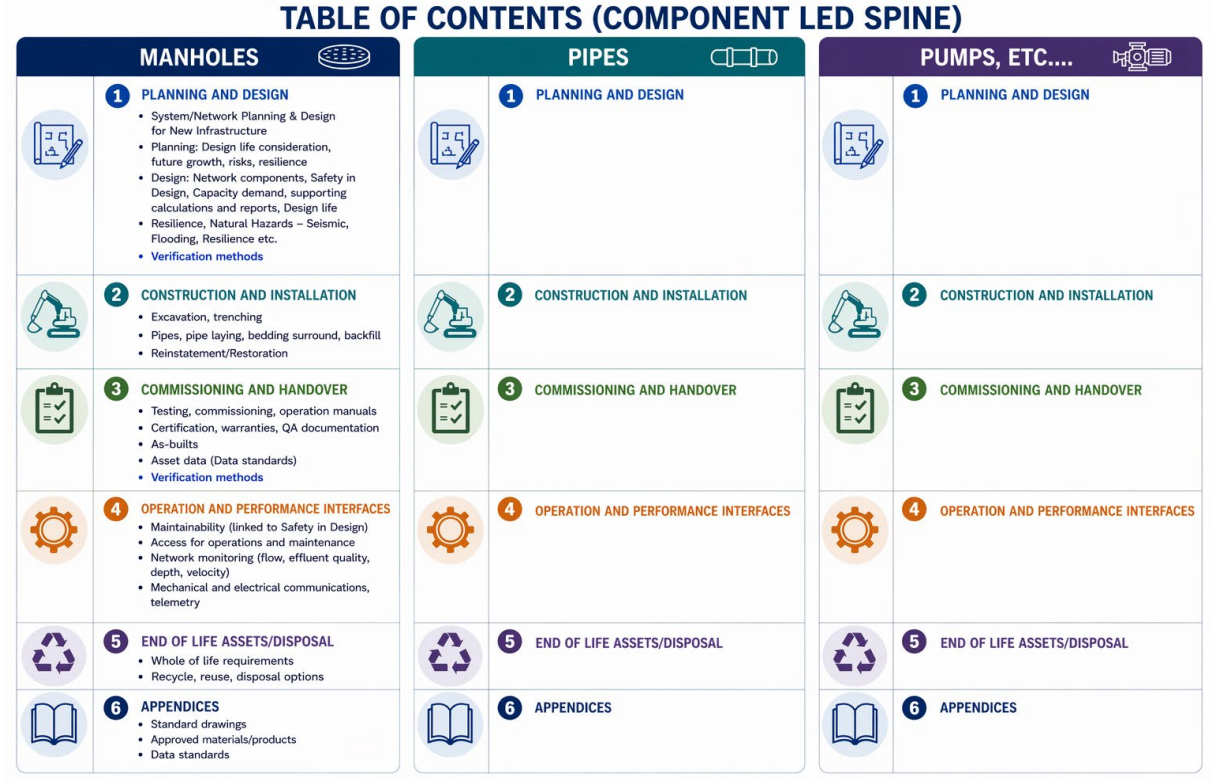
Codes need to be organised in a way that users can navigate. The structure should reflect how designers, developers, contractors and reviewers look for compliance pathways.

Codes should be organised primarily by water service

We considered three broad approaches.

1. **Single integrated Code:** one Code covering all water services.
   - ➢ *Would support consistency and reduce duplication, but would be large, complex and harder for users to navigate.*
2. **Water-specific Codes:** separate Codes for water supply, wastewater and stormwater.
   - ➢ *Best aligns with how most users work and allows each Code to reflect the distinct technical needs of each water service.*

Figure 12: Example: Component led spine (within a Wastewater CoP)



Source: GHD

3. **Highly granular Codes:** separate Codes for individual components, activities or lifecycle stages.
   - ➢ *Could be more precise, but risks fragmentation and a large suite of documents to maintain.*

We recommend that Codes of Practice are organised primarily by water service (approach 2):

- Water supply Code of Practice
- Wastewater Code of Practice

- Stormwater Code of Practice.

Each Code would bring together recognised pathways for relevant infrastructure components and activities within that water service.

Codes should avoid unnecessary duplication. Common material that applies across the three waters, such as asset data, as-built information, commissioning records, evidence templates, standard drawing conventions or common definitions, could be held once and referenced across the water-specific Codes.

This could be done through a common part, schedule, technical standard, shared digital layer or separate Code if justified. The key point is that the primary user pathway should remain easy to navigate, while common material is managed consistently.

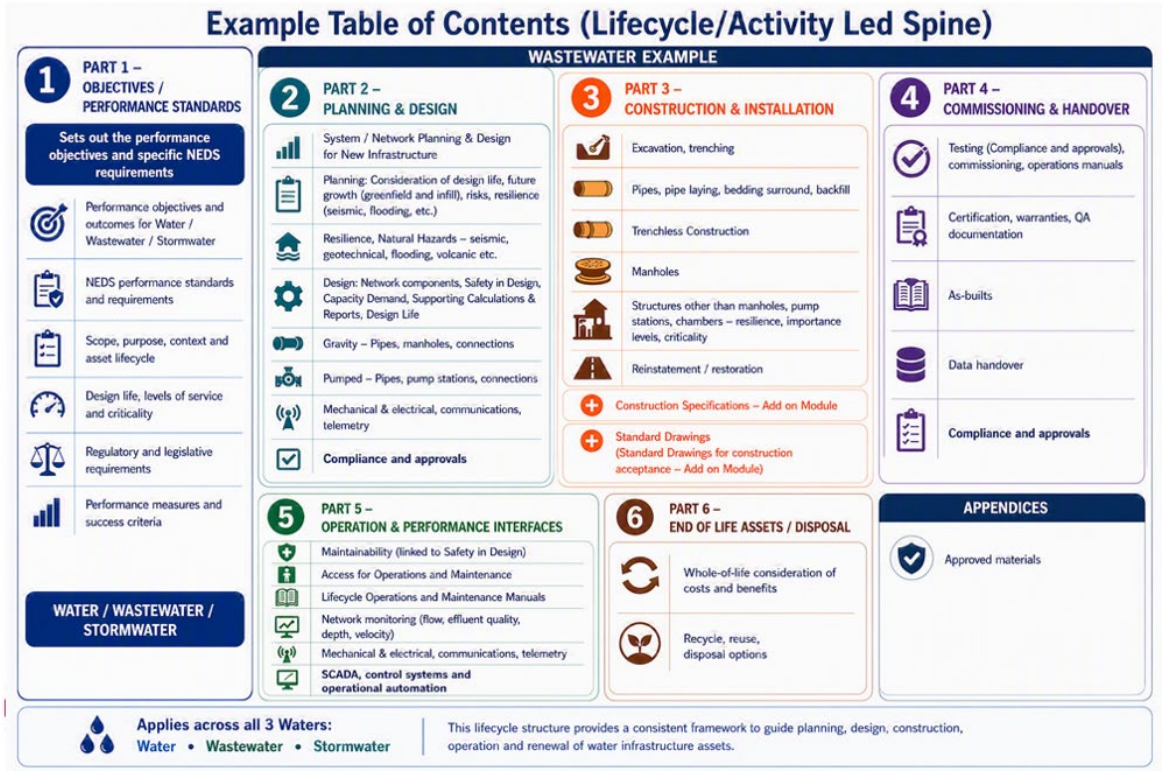
Within each Code, there are options for how they are structured

The second structural question is how each water-specific Code should be organised internally.

We considered two main approaches.

1. **Component-led structure:** Code chapters are organised around infrastructure components, such as pipes, pump stations, rising mains, manholes, storage or controls (Figure 12).

Figure 13: Example: Lifecycle led spine (within a Wastewater CoP)



Source: GHD

   - ➢ *Easier for designers, developers and reviewers to navigate because requirements for a component are located together.*
2. **Lifecycle-led structure:** Code chapters are organised around lifecycle stages, such as design, construction, commissioning, operation, renewal and decommissioning (Figure 13).
   - ➢ *Stronger for process control and assurance but can spread*

requirements for one asset across multiple sections.

Either structure could be used. The best structure may also differ by water service or by subject matter. For example, a component-led structure may work well for wastewater pump stations or water supply storage, while a lifecycle-led structure may be useful for commissioning, handover, asset data or decommissioning requirements that cut across multiple components.

The key design point is that each Code should be easy for users to navigate and should clearly show which NEDS requirements it provides a pathway for. Whether the Code is organised by component, lifecycle stage, or a hybrid of both, users should be able to identify:

- The infrastructure, activity or lifecycle point the Code applies to
- The relevant NEDS requirement
- The accepted method, specification or process
- The evidence needed to demonstrate compliance.

Over time, digital presentation could allow users to navigate the same content by water service, component, lifecycle stage or NEDS requirement.

The level of prescription in Codes of Practice

Codes need to be detailed enough to provide confidence that following them will meet the NEDS requirements. However, they should not simply recreate local engineering standards at a national scale or become more prescriptive than necessary.

A highly prescriptive approach may work for repeatable components or settled methods. It will be less suitable where performance depends heavily on local site conditions, hydraulic modelling, network configuration, growth assumptions, catchment response, groundwater, topography, rainfall, existing live networks or other project-specific factors.

Water services infrastructure is different from buildings, as described in the breakout box below. Water networks are highly interconnected, often underground, and strongly affected by local physical and network conditions. A Code that tries to prescribe every answer could create over-design in some places, under-design in others, or frequent departures that slow delivery.

A balanced approach to prescription is preferred

We considered the implications of three broad levels of prescription, shown in Table 13.

The preferred approach is therefore a balanced Code model. The level of prescription should vary depending on the requirement, infrastructure, level of risk and maturity of technical practice.

This allows Codes to provide practical certainty without removing the engineering judgement needed for water infrastructure. The balanced approach is detailed in Table 14. Codes should show how engineering judgment is applied and verified.

Choices on prescription: Water networks need a different approach

Water networks are fundamentally different from buildings, so the prescriptive verification approach as exists in the Building Code will not generally be practical or efficient.

Buildings are discrete, self-contained assets, built above the ground surface with defined boundaries and relatively predictable interactions with other infrastructure types. In modern developments buildings also tend to use highly repeatable designs.

Water networks, by comparison, are designed as highly interconnected systems (pipes, pumps, overflow, controls) and for the most part are located underground where the conditions are less well understood and need to be investigated on a case-by-case basis before design can be developed. Performance depends on the behaviour of the entire network, in some cases the whole catchment, surrounding land use, and population related demand for services rather than the needs of one component such as a single building.

Buildings can be designed more discretely, almost in isolation. Buildings have standardised loads, materials and design approaches and limited variability once site parameters are set, whilst water networks highly sensitive to local conditions such as topography, catchment response, groundwater, climate and rainfall variability and require context-specific engineering judgement.

Building calculations are largely deterministic (loads, stress, factors of safety), whereas water networks design often relies on hydraulic models and assumptions (e.g., inflow/ infiltration, roughness, growth), not all inputs can be strictly prescribed or independently recalculated. The water network often requires iterative processes, and design adjustments during construction due to unknown ground conditions and integration with existing live networks.

Thus a "reproduction" of the prescriptive approach adopted through the Building Code does not appear to be directly transferable to the water sector across regions without creating the risk of over-design or under-design and a rigid verification loop, which is likely to slow delivery significantly with each design change needing to be reverified.

Codes should not avoid engineering judgement. In many parts of water infrastructure, judgement will be necessary.

The role of a Code should be to make that judgement more structured, transparent and reviewable. This may include specifying:

- The method or process to be followed
- The inputs that must be used
- The assumptions that must be documented
- The modelling, testing or inspection required
- The evidence that must be provided
- When independent review or additional assurance is needed.

This is particularly important where performance depends on local inputs, network effects, uncertain ground conditions, future demand or integration with existing infrastructure.

A good Code should therefore not only say "use engineering judgement". It should explain how that judgement is to be applied, evidenced and checked.

The way compliance is demonstrated should reflect the nature of the Code pathway

As shown in Table 14, for more prescriptive pathways, compliance may be demonstrated by showing that specified designs, materials,

Table 13: Levels of prescription considered

Option	Description	Assessment
Simple or low-prescription Codes	Set broad methods or good-practice expectations with significant reliance on practitioner judgement.	Unlikely to provide enough consistency or certainty. Risk of duplicating the NEDS layer. Does not align with the purpose of Codes.
Balanced or hybrid Codes	Combine prescriptive elements, national methods, evidence requirements and structured engineering judgement.	Best fit for water infrastructure because it provides consistency while allowing local inputs and project-specific judgement.
Highly prescriptive Codes	Set detailed standardised requirements, calculations, methods, materials or designs.	Provides certainty for repeatable matters, but may be too rigid for complex, site-specific or network-dependent infrastructure.

Table 14: A balanced or hybrid approach to prescription in Codes

Code approach	Best suited to	What the Code does
Prescriptive	Settled, repeatable and lower-risk matters.	Specifies the accepted design, product, drawing, detail, material, test or process.
Method-based	Matters where a consistent process is needed, but local inputs affect the result.	Specifies the method, inputs, assumptions and calculation or modelling process.
Evidence-based	Matters requiring engineering judgement or project-specific assessment.	Specifies what must be assessed, documented, justified and provided for review.
Assurance-focused	Higher-consequence, novel or difficult-to-verify infrastructure (where a Code is still suitable).	Specifies review, testing, commissioning, certification or independent assurance expectations.

calculations, tests or construction methods have been followed.

For method-based pathways, compliance may depend on showing that the required method has been applied correctly, including the use of appropriate local inputs, assumptions and modelling.

For evidence-based pathways, compliance may require a documented engineering assessment, supported by modelling, calculations, design justification, peer review or other assurance.

Alternative solutions and verification

Alternative solutions are essential to the performance-based nature of NEDS.

A user should be able to propose a different design, method, product, technology or process where they can demonstrate that the same NEDS requirement is met. This pathway is important for innovation, unusual sites, new technologies, lower-cost approaches and circumstances where a Code pathway does not fit the project context.

Alternative solutions must remain an available pathway

Alternative solutions may be needed where:

- Site-specific or local conditions are not addressed by the Code
- The infrastructure is large, complex, integrated or bespoke
- The design uses innovative or non-standard technologies, materials or methods
- The issue cannot be easily standardised into repeatable rules or specifications
- There is a conflict with existing constraints, approvals, consents, bylaws or water safety or risk management requirements
- Unforeseen conditions or construction changes mean the Code pathway no longer fits.

However, alternative solutions also need discipline. They should not become a source of inconsistent decision-making between water service providers.

For alternative solutions to work well, NEDS requirements need to be clear and assessable. Evidence expectations also need to be clear enough for a water service provider to decide whether the alternative solution meets the same requirement as the Code pathway.

This means alternative solutions should be assessed against:

- The relevant functional requirement
- The relevant performance requirement
- The required evidence or compliance demonstration
- Any relevant proportionality or classification settings
- Any applicable bylaw or connection and vesting requirement.

Alternative solutions may also create capability and capacity pressures for water service providers, particularly where they require complex technical assessment. This could discourage their use if the process is uncertain or applied inconsistently.

The WSA should therefore monitor how alternative solutions are used over time. If the same alternative approach is repeatedly accepted, this may indicate that the relevant Code should be updated. If alternative solution decisions are inconsistent, this may indicate that NEDS requirements, evidence expectations, guidance or future verification methods need to be clearer.

Verification methods should not be a separate first-edition layer

The Building Code uses Acceptable Solutions and Verification Methods as separate recognised compliance pathways. NEDS can use similar deemed-to-comply logic through Codes of Practice, while still allowing alternative solutions.

As the Act does not provide for similar 'verification methods' in the NEDS framework, we do not recommend seeking to develop these as

part of the first edition of the NEDS. The need for verification methods could be monitored over time and implemented in the future if seen as beneficial.

Instead, the first edition should focus on:

- Clear and assessable NEDS requirements
- Code pathways that include the relevant methods, tests, modelling approaches, commissioning steps and evidence packages
- Guidance and templates where needed to support consistent interpretation.

Where a particular modelling, testing, inspection or calculation method must be mandatory, it can be specified in the NEDS requirement itself. A separate verification-method layer could be considered later if experience shows it would improve consistency, innovation or assurance.

What this means for the preferred framework

Under the preferred approach:

1. NEDS requirements set what infrastructure must do and the benchmark that must be met
2. Codes of Practice provide recognised ways of meeting those requirements
3. Alternative solutions remain available where the same requirements can be demonstrated through a different approach
4. Codes should be organised primarily by water service, with common material managed once where possible
5. Water-specific codes could be structured by either infrastructure component or lifecycle point.
6. Codes should specify the evidence, documentation, review and assurance needed to demonstrate compliance
7. Codes should be detailed enough to provide certainty, but flexible enough to allow legitimate local inputs and engineering judgement
8. Verification methods should be incorporated into requirements or Codes in the first edition, rather than created as a separate layer
9. Not every NEDS requirement needs Code coverage.

This keeps the framework performance-based while giving users practical pathways to compliance.

Prioritising the first edition of NEDS

As noted previously, the preferred approach is a **prioritised NEDS**. This means the first edition should establish the common framework but should not attempt to develop every possible detailed requirement and Code pathway upfront.

Developing clear and assessable requirements will require technical work, judgement, testing and engagement. Developing recognised Code pathways will add further work, because the WSA will need to define both the requirement and one accepted way of meeting it. The first edition therefore needs a clear basis for deciding where detailed development should start.

This section explains how the WSA should prioritise:

- Which NEDS requirement areas are developed in detail first
- Which Code pathways should be developed alongside those requirements.

The goal is to make the first edition coherent, useful and deliverable rather than thin or incomplete.

Confirm the first-edition scope before prioritising detailed development

Before applying the prioritisation tests, the WSA should confirm which areas are not candidates for detailed first-edition NEDS requirements or Code pathways. This helps set clear boundaries for the first edition, so the longlist and prioritisation process focus on areas the WSA intends to develop now.

On current assumptions, treatment plants would not be developed through the first edition of NEDS because treatment-related infrastructure is expected to be best addressed through Infrastructure Design Solutions. Reservoirs would also sit outside the first edition of NEDS.

These areas may still have important interfaces with network infrastructure. The first edition may need to clarify those interfaces to avoid gaps or duplication.

Prioritisation should start with a longlist of requirement areas

The first step should be to develop a longlist of candidate requirement areas across the intended scope of NEDS.

The longlist should draw from:

- The common performance domains
- The main infrastructure functions and components across water supply, wastewater and stormwater
- Lifecycle points covered by the legislation, including design, construction, connection, commissioning, vesting, operation, maintenance, renewal and decommissioning
- Known current-state problems, such as local variation, approval delays, inconsistent asset acceptance, poor asset information and unclear alternative solution assessment
- Coverage of existing local codes of practice, standards and sector practice
- Areas where an early code pathway may be needed to make a requirement usable or where it would provide significant benefit.

Requirement areas should be assessed against two questions

Potential requirement areas should then be assessed against two questions.

1. Would early national direction make a material difference?

This question asks whether a requirement area should be developed early because national direction would improve outcomes, consistency, efficiency or confidence in the regime.

The benefit of early national direction is likely to be higher where:

- The consequence of non-performance is significant
- Current local variation is creating material cost, delay, redesign, approval disputes or inconsistent asset acceptance
- The requirement area affects high-volume or growth-related activity
- A recognised Code pathway would materially reduce inconsistency, cost, delay or uncertainty
- The requirement is needed to support consistent assessment of alternative solutions
- NEDS would fill a gap not adequately managed elsewhere
- The absence of direction would affect the credibility or usability of the first edition.

This question should not prioritise only what is most visible or urgent. Some issues may be less visible at approval but important to long-term performance, such as durability, maintainability, leakage, and infiltration.

Table 15: First-edition treatments of requirement areas

Benefit	Readiness	
High	High	Develop detailed NEDS requirements in the first edition. Develop Code pathways alongside them where a recognised pathway would materially improve usability, consistency or efficiency.
High	Lower	Signal the area in the first edition but develop detailed requirements later. Consider interim guidance, targeted evidence requirements or staged development.
Lower	High	Do not prioritise unless it supports another priority area. Technical readiness alone is not enough.
Lower	Lower	Defer and monitor. Reconsider in later editions if the need or technical basis changes.

2. Can clear and assessable requirements be developed well enough now?

This question asks whether the area is ready to be developed into clear and assessable first-edition requirements.

Readiness is likely to be higher where:

- The infrastructure function is clear
- The boundary with other regimes is clear
- The relevant infrastructure, activity or lifecycle point can be defined
- There is a settled technical basis for setting the performance benchmark
- Evidence and compliance expectations can be specified
- The requirement can be made proportionate
- Sector practice is mature enough to support implementation.

A requirement area may be important but not ready for detailed first-edition development. In those cases, NEDS may need to signal the area, set limited direction, or leave detailed requirements for a later edition.

These two questions produce four broad treatments, shown in Table 15.

This approach avoids two risks. It avoids prioritising only areas that are technically easy, even if early national direction would add limited value. It also avoids rushing detailed requirements in areas where the consequences are significant, but the technical basis is not yet ready.

Code pathways should be developed alongside requirements where justified

Code pathways should be considered after a requirement area has been identified as a priority for detailed development.

A Code pathway should only be developed where the underlying NEDS requirement is clear enough. The Code needs to be anchored to:

- The functional requirement
- The performance requirement
- The infrastructure or activity it applies to
- Any proportionality or classification settings
- The evidence needed to demonstrate compliance.

In practice, a requirement area becomes a stronger first-edition candidate where a Code pathway would add significant practical value. For example, if national direction is needed and a recognised Code pathway would reduce repeated local variation, approval delay or uncertainty, that strengthens the case for developing the requirement in the first edition.

Figure 14: Prioritising Codes of Practice by benefit and ability to be codified

	High benefit to national code	Low benefit to national code
High ability to be codified	**Develop first** **Examples:** • Pump stations (currently light/lacking coverage, e.g. WGN regional standard for a high criticality asset) • Greenfield development items – driven by growth directives (applies to all 3 waters) • Codes that give effect to NEDS via Bylaws **Consider:** Prioritise for CoP development	**Monitor and develop over time as resource allows** **Examples:** • Operational procedures e.g. colour coding of water assets, etc • National standard for products and materials – almost all WSPs have one already **Consider:** Develop later if needed
Low ability to be codified	**Evaluate and consider benefits vs costs/limitations** **Examples:** • Climate resilience, local variations in seismic, volcanic activities, etc. • Stormwater "Green infrastructure" – high benefit but difficult to codify at this point in time **Consider:** Guidance and Timing	**Monitor but likely do not develop** **Examples:** • Niche one-off, site specific infrastructure (specific design/unique catchment solutions) • Treatment plants – water and wastewater – driven by WEPS as performance outcomes and design often to large degree bespoke to site and community context **Consider:** Guidance and Timing

Source: GHD

Code prioritisation should consider benefit and codifiability

The decision to develop a Code pathway should then be guided by two questions.

1. Would a recognised Code pathway make a material difference?

The benefit of a Code pathway is likely to be higher where:

- Inconsistent practice creates material cost, risk, delay or uncertainty
- The activity is high-volume or growth-related
- There is a strong need for consistency, such as for connections, vesting, commissioning or handover
- The activity affects public health, environmental protection, service reliability, resilience or long-term asset performance
- A recognised pathway would reduce repeated case-by-case judgement or alternative solution assessment.

2. Can a clear and repeatable Code pathway be developed now?

The ability to codify is likely to be higher where:

- Engineering practice is established, repeatable and well understood
- Reliable outcomes can be achieved without heavy dependence on case-by-case judgement
- Local inputs can be defined and used consistently
- Interactions between components can be managed through clear methods or evidence requirements
- Existing local codes, Water New Zealand material, standards or sector practice provide a credible starting point
- The code pathway can be clearly anchored to NEDS requirements.

Where both answers are strong, the requirement and Code pathway should be developed together. Where the requirement is important but the Code pathway is not yet ready, the first edition may include the NEDS requirement and leave Code material, guidance or templates for later development.

Indicative first-edition starting set

The following areas appear to be sensible starting points for detailed first-edition development. This list is indicative only and should be tested with technical specialists, tangata whenua, developers, water service providers and the wider sector.

The strongest early candidates are areas where national direction would improve certainty, reduce duplication and support consistent infrastructure acceptance, and where clear requirements and Code pathways can be developed now.

Developer-built infrastructure connecting to, or vesting into, WSP networks

Developer-built infrastructure should be a strong first-edition priority where it is intended to connect to, or be vested into, a water service provider network.

Bylaws continue to set the local process for procedural matters such as applications, timing, fees, approval steps and administrative requirements. The role of NEDS is to set the infrastructure performance requirements that developer-built infrastructure must meet before it is connected to, or accepted into, a WSP network.

This is a strong early candidate because it is high-volume, closely linked to growth, and a major area where local variation can create cost, delay, redesign and uncertainty.

Recognised Code pathways would add value where standard methods, details, evidence templates or handover requirements would give developers, designers and WSP reviewers a clearer national route to compliance.

Pumping assets, particularly wastewater pump stations

Pumping assets are common across networks and can have significant consequences if they fail or underperform.

Wastewater pump stations are likely to be a strong early candidate because they are repeatable enough to support national direction and Code material, while also being closely linked to overflow risk, service continuity, environmental performance and resilience.

Early requirements could clarify expectations for capacity, reliability, redundancy, emergency storage, overflow management, controls, telemetry, commissioning and evidence requirements. Code pathways could provide recognised approaches for common pump station design, construction, testing and handover.

Water supply reticulation

Water supply reticulation is a likely early priority because of its connection to public health, service continuity and network performance.

Early requirements could address matters such as pressure, flow, supply continuity, contamination control, backflow risk, disinfection before commissioning and network integrity. These requirements should support, but not duplicate, drinking water standards or other drinking water regulatory tools.

Asset data, as-built and handover information

Asset data, as-built and handover information are strong cross-cutting candidates.

They apply across all three waters and support commissioning, vesting, operation, maintenance, renewal, monitoring and future system learning. They are also central to developer certainty because they define what information must be provided before infrastructure is accepted into a network.

Early requirements could set consistent expectations for design evidence, as-built records, asset data, commissioning information, handover documentation and records of compliance decisions. Code material could provide common templates, formats and data standards that can be referenced across the water-specific Codes.

What this means for the preferred framework

Under the preferred approach, the first edition should:

- Establish the common performance framework
- Develop clear and assessable requirements in priority areas
- Develop code pathways alongside those requirements where a recognised pathway would materially improve usability, consistency or efficiency
- Signal important areas that require later or bespoke development.

National Standard for three-waters asset data

A working group of the Water New Zealand Smart Water Infrastructure Group (SWIG) is developing an asset data standard for water services infrastructure, with the intention that this work could form the basis of a potential Code of Practice.

If a Code pathway is pursued for asset data standards, a review of those standards will be needed to:

- Ensure alignment with the final proposed outcomes and specific requirements determined through the next phase of work
- Ensure that the proposed standards are supported across the sector
- Consider the appropriate home including using the proposed standard as a specific

This gives the WSA a practical development path. It allows the first edition to provide useful national direction early, while preserving a coherent framework that can be built out over time.

Part 4: Impact analysis

Cost-benefit and impact analysis

Introduction

This cost-benefit analysis has been prepared with reference to the principle of responsible regulation in section 9(l) of the Regulatory Standards Act: legislation should be expected to produce benefits that exceed the costs of the legislation to the public or persons.

We can consider the impacts of standardisation in principle

The analysis in this Part is based on the initial design work we have been asked to complete. This does not include consideration of or advice on specific requirements to be included in NEDS, that is, the performance levels or thresholds that would be codified as national standards for specific infrastructure. This means the analysis in this Part considers the impacts of standardisation but not the impacts of specific requirements yet to be developed as standards.

There is a reasonable volume of literature around the benefits of standardisation. We describe this literature in this Part of the report. While this literature suggests benefits can arise from NEDS and Codes standardising requirements across the lifecycle of water infrastructure, we caution that the specific thresholds and performance requirements yet to be codified in NEDS and Codes could have significant impacts on the costs and benefits of the system.

Crucially, performance requirements could reflect different levels of stringency, from minimal, through good practice, to "gold-plated". Different levels of stringency could apply across different domains. The change in practice required (and therefore the costs and benefits incurred) could vary significantly across New Zealand, depending on the level of current requirements in local engineering Codes and differences in these across districts. It is impossible to make enough robust assumptions at this point of the work to enable quantified cost-benefit analysis on possible performance outcomes.

Key aspects of NEDS and Codes drive impacts

We make two points under this heading.

First, the Codes will provide a regulator approved means to comply with the performance requirements of NEDS. The coverage of codes and the technical solutions described in them will be important to the costs of delivering infrastructure and the extent of benefits from standardisation.

Second, NEDS will apply to the lifecycle of water infrastructure. Current council Codes generally only apply to design and build phases. This means where there are benefits from standardisation, they can be realised in phases not currently considered by bespoke council Codes.

Structure and limitations of this part

Given the limitations described above, it is very hard to quantify the impact of NEDS and Codes while their contents have yet to be proposed or determined. Hence, this part of the report first discusses the benefits of standardisation before considering how they may play out in the lifecycle of water infrastructure. Analysis is largely qualitative, as quantitative data are limited. We have relied heavily on professional opinions of senior sector practitioners, together with desk-based review of literature on the benefits of standardisation and indicative case-studies.

The benefits of standardisation are well-established

Overview: Why standardisation matters

Standardisation refers to the development and application of agreed specifications, processes, or performance requirements across products, services, and systems – essentially what will be achieved through standing up NEDS and Codes. In practice, standards establish a common language for market participants, reduce uncertainty, and align behaviours across firms, regulators, and consumers. As highlighted by Standards New Zealand and the NZIER research it commissioned, standards are "formally established and accepted norms" that underpin consistency, safety, quality, and interoperability across the economy.[31]

At a system level, standardisation is widely recognised as a foundational element of modern economies. It supports the functioning of markets, enables the diffusion of knowledge, and provides assurance to consumers and regulators. The International Organization for Standardization (ISO) similarly emphasises that consensus-based standards create value for organisations and society by improving decision-making, enabling benchmarking, and supporting innovation and trade.[32]

In the New Zealand context, the standards system plays a critical role in both economic performance and public-good outcomes. NZIER's analysis finds that standards are integral to productivity, innovation, and trade, and that strengthening the standards system can act as a low-risk, high-return policy lever for lifting GDP and household incomes.

Productivity, efficiency, and cost reduction

A central benefit of standardisation is its impact on productivity and efficiency. Standards reduce duplication, streamline processes, and allow firms to leverage economies of scale. By codifying "tried and tested" approaches, they enable businesses to focus on higher-value activities rather than reinventing solutions in each project or jurisdiction.[33]

Standards New Zealand highlights that standards help businesses lower production costs by reducing redundancy and errors, shorten time to market, and improve organisational efficiency and resilience.[34]

These micro-level effects aggregate into macroeconomic gains. NZIER estimates that a 1% increase in the stock of New Zealand standards could increase GDP by approximately NZ$1.1 billion, reflecting productivity improvements and more efficient resource use.

From an economic perspective, standards contribute to productivity through several channels:

- Economies of scale: standardised inputs and processes allow firms to scale production without bespoke adaptation
- Reduced transaction costs: common expectations lower the need for negotiation, verification, and due diligence

31 https://www.standards.govt.nz/assets/Resources/economic-contribution-of-standards-in-new-zealand.pdf
32 https://www.iso.org/sites/materials/benefits-of-standards/benefits-detail57da.html?emid=6
33 https://www.standards.govt.nz/understanding-standards/explaining-standards/benefits-of-standards
34 https://www.standards.govt.nz/understanding-standards/explaining-standards/benefits-of-standards/economic-research

- Knowledge diffusion: standards embed and disseminate best practice and technological advances.

These channels are consistent with international evidence. ISO notes that standards support value creation across organisational value chains by reducing failure rates, optimising resource use, and improving process efficiency.

Trade, competition, and market access

Standardisation plays a critical role in enabling trade by reducing technical barriers and facilitating interoperability between systems. A robust standards and conformance system allows goods and services to move across jurisdictions with reduced compliance costs and greater certainty.[35]

In New Zealand, standards support international market access by aligning domestic practices with global norms. Further, mutual recognition of conformity assessments allows exporters to demonstrate compliance overseas using domestic certification systems.

NZIER's analysis indicates that standards are associated internationally with a significant share of export growth, and that they are essential to maintaining competitiveness in global markets.

At the firm level, compliance with recognised standards can provide assurance of quality and safety, differentiate products in competitive markets, and build trust with customers and supply chain partners.

More broadly, standardisation promotes effective competition by ensuring a level playing field. Clear specifications reduce information asymmetry and enable new entrants to compete on quality and innovation rather than proprietary systems or opaque requirements.

Innovation, diffusion, and dynamic efficiency

Both NZIER and international evidence find well-designed standards enable innovation by reducing uncertainty and facilitating collaboration.

NZIER's findings highlight that standards are "integral" to innovation, as well as productivity and trade. They create trust between market participants, lowering transaction costs and enabling experimentation and support the diffusion of new technologies across firms and sectors.

ISO's framework similarly emphasises that standards help organisations identify value drivers, benchmark performance, and integrate new technologies into existing systems. This can be understood in terms of dynamic efficiency:

- Standards codify baseline requirements, allowing firms to innovate above that baseline
- Interoperability enables new technologies to integrate with existing systems, and
- Shared frameworks reduce the risk of innovation and encourage investment.

In the infrastructure sector, this is particularly important. Performance-based standards (such as those envisaged under NEDS) can enable innovation by allowing alternative solutions that meet defined outcomes, rather than prescribing specific methods.

Public-good benefits: safety, quality, and environmental outcomes

A distinctive feature of standardisation is its contribution to public-good outcomes. NZIER finds that 82% of New Zealand standards deliver "non-market" benefits, including improvements

[35] https://www.mbie.govt.nz/business-and-employment/business/standards-and-conformance

to health and safety, consumer protection, environmental sustainability, and social inclusion.

Standards contribute to these outcomes by setting minimum acceptable levels of quality and safety, reducing risks associated with product or infrastructure failure, and enabling regulators to enforce consistent requirements.

The Ministry of Business, Innovation and Employment notes that standards and conformance systems help minimise health, safety, and environmental risks and support informed consumer decision-making.[36]

In infrastructure contexts, these benefits can be significant. For example:

- Weak or inconsistent standards can contribute to system failures (e.g. water quality issues), and
- Strong, consistent standards improve reliability and reduce the likelihood of adverse events (but can increase costs).

Infrastructure-specific benefits in New Zealand

The case for standardisation is particularly strong in infrastructure, where fragmentation across jurisdictions creates inefficiencies and risks. New Zealand's infrastructure systems – especially water services – have historically relied on a patchwork of local standards and codes.

Evidence from sector practice shows that standardisation can deliver the following:

Consistency and reduced fragmentation

- Standardised approaches provide clarity and confidence for regulators, providers, and developers.
- Common frameworks enable knowledge sharing and consistent service delivery.[37]

Cost savings and efficiency gains

- Reduced duplication of design effort when moving across regions. Local Government New Zealand (LGNZ)'s 2024 Sector Capability Survey found that developers often face design costs of 5-10% of project budgets when moving between districts because stormwater or wastewater specifications vary unnecessarily.
- Lower compliance and transaction costs for developers and contractors.
- Evidence from New Zealand infrastructure suggests national standards can reduce design costs and improve tendering confidence.
  - NZTA's adoption of national pavement & bridge standards reduced average design costs by 10-15% & improved contractor confidence in tendering.
  - KiwiRail achieved significant savings in construction by standardising its bridge replacements.[38] By adopting and tailoring the AS5100 load model to suit New Zealand's rolling stock and future requirements, KiwiRail achieved a 40% improvement in design efficiency. KiwiRail costs for steel span bridges have reduced from close to $300,000 per metre to below $140,000 per metre. While material costs remained constant, the industry benefitted from a clear understanding of KiwiRail's bridge replacement approach, enabling more efficient planning and execution.
  - Kāinga Ora developed a suite of standardised house designs (also known as optimised plans) for new single-level and double-storey homes in

[36] https://www.mbie.govt.nz/assets/db8a50ffd9/guide-standards-and-conformance-system.pdf
[37] https://www.waternz.org.nz/ModularPage?Action=View&ModularPage_id=188
[38] https://www.engineeringnz.org/news-insights/fast-tracking-bridge-construction/

a range of sizes.[39] This enabled it to deliver new homes quickly and cost-effectively. The average build cost in FY24 was $3,473 per square metre. The move to new standardised house plans and other transformation work means Kāinga Ora is on track to meet and exceed its $2,980 per square metre target by the end of FY26 – a 14% reduction.

Improved asset performance and lifecycle outcomes

- Standardised design requirements can improve durability, resilience, and whole-of-life cost performance.
- Consistency can enable better maintenance, renewal planning, and asset management.

Better data, benchmarking, and regulation

- Common standards enable consistent data collection and performance benchmarking.
- This supports more effective economic regulation and investment planning.

Continuous improvement

- National frameworks support sector-wide learning and iterative improvement over time.
- Standards can be administered to evolve with technology and best practice, embedding improvements across the system.

The development of NEDS for water services reflects these drivers, aiming to create a consistent national baseline across design, construction, and operation.

System-level impacts and policy implications

Taken together, the evidence from New Zealand and international sources suggests that standardisation delivers benefits across multiple dimensions:

- Static efficiency: reduced costs and improved resource allocation
- Dynamic efficiency: enhanced innovation and technological diffusion
- Market functioning: improved trade, competition, and transparency, and
- Public outcomes: stronger safety, environmental, and social outcomes.

From a policy perspective, NZIER concludes that investment in standards infrastructure represents a high-return intervention, with benefits spanning both economic and non-economic domains.

However, the benefits of standardisation depend on design choices. Standards must be regularly updated to reflect innovation, sufficiently flexible (for example, performance-based) to avoid constraining solutions to local problems, and aligned with international frameworks where appropriate.

Conclusion

Standardisation is a foundational enabler of economic performance and public wellbeing. In New Zealand, standards support productivity, trade, and innovation while delivering significant public-good benefits in safety, environmental protection, and social outcomes.

In infrastructure – particularly water services – the case for standardisation is especially strong. Fragmentation imposes tangible costs and risks, while national consistency can unlock efficiency gains, improve asset performance, and support better regulatory outcomes.

[39] https://kaingaora.govt.nz/assets/News/Media-centre/Information-sheet-on-standardised-design-plans.pdf?v=553a1fa8165e7ebdc382469ce604bee4cb3029fd

Overall, the evidence from Standards New Zealand, NZIER, and ISO indicates that standardisation is not simply a technical exercise. It is a core policy lever for improving the functioning of markets, enhancing infrastructure performance, and supporting long-term economic and social outcomes for Aotearoa New Zealand.

The impacts of standardisation across the lifecycle of water infrastructure

This section considers how costs and benefits are generated across the infrastructure lifecycle. For the purposes of this exercise, we break the lifecycle into four phases as in Table 16.

Table 16: Percentage of total lifecycle cost contributed by phase

Phase	Percentage of total lifecycle cost – range[40]	Range midpoint
1. Planning and design	5 – 15% (and more for really complex jobs)	10%
2. Acquisition and build	10 – 30%	20%
3. Operations and maintenance	40 – 70%	55%
4. Renewal, upgrade and disposal	10 – 25%	17.5%

Each is considered in turn below.

We reiterate the limitations

To reiterate the limitations of this exercise, we can consider the impacts of standardisation without knowing how stringent the requirements of NEDS and Codes will be. Our analysis suggests NEDS and Codes will be generally beneficial over time. However, benefits could be reversed to some degree if NEDS necessitate a much higher level of cost to build infrastructure through 'gold plated' standards. We note however that where costs are raised as a result of NEDS, this will be to achieve additional benefits in areas like resilience, reliability and environmental protection. Consideration of those matters is for further work.

We have little information that would inform a view of costs. Comments on likely costs are considered after the phase-by-phase analysis.

Phase 1. Planning and design

Estimated cost savings based on GHD's case studies

This is the phase where NEDS and Codes are most likely to reduce costs. It is also the phase where standardisation is most likely to result in net benefits which can be estimated (within a wide band) without knowing the exact thresholds or requirements.

This phase includes planning, engineering design, and obtaining regulatory approvals.

We estimate significant benefit could be generated in a ten-year window from standardisation creating efficiencies in this phase.

[40] The split of lifecycle costs across phases can vary significantly, as indicated by the ranges in the table. The ranges are indicative and have been informed by a range of sources and professional judgement.

If the savings suggested by the "routine renewals" case study are extrapolated to the whole investment programme, the benefits fall within a range with an upper bound of nearly $4 billion and a mid-point of $2.45 billion.

- New Zealand will invest $49 billion in water services infrastructure over the next decade.[41]
- GHD's "routine renewals" case study suggested "that non-construction costs (design, approvals, management) on projects like this one could potentially be cut by a significant margin for instance, reduced from roughly 10 to 15% of total project cost to perhaps 7 or 8% if unnecessary procedures are stripped away and only critical compliance steps are mandated".
- If applied to the whole of $49 billion of project costs, this could reduce "non-construction costs":
  - from in the order of between $4.90 billion (at 10% of total cost) and $7.35 billion (at 15% of total cost)
  - to between $3.43 billion (7%) and $3.92 billion (8%).
- If assumptions hold, and depending on the design and scope of the NEDS and associated Codes, this could result in savings of between $0.98 billion and $3.92 billion, with a midpoint of $2.45 billion.

These savings would rely on the final form of NEDS resulting in a very "efficient" regime, and taking the same view as a GHD contact on what constitutes "unnecessary procedures" across design, regulatory approvals, and project management.

Savings from standardisation are likely higher for routine renewals than for more complicated projects. Standardisation achieves the greatest benefits where processes are repeatable (that is, "routine") so routine renewals are a candidate for achieving greatest benefit.

GHD's "greenfields" case study suggested cost savings "in the order of up to 20-25% [could be possible through NEDS] across design and approvals, providing the approvals processes and levels of prescription are commensurate with those currently in place".

From $49 billion in water infrastructure projects, this could result in savings of up to $1.8 billion (if 15% of cost was attributable to planning and design – $7.35 billion – and this figure was reduced by 25%).

GHD's case studies also suggest NEDS would create time savings in design, planning and obtaining approvals. GHD's professional judgement suggests:

- for a large asset upgrade project, NEDS could reduce approval and design timeframes by up to six months
- for a routine renewal project, NEDS could reduce approval and design programmes by several weeks
- for a greenfields project, up to several months could be saved through using design and approvals guided by NEDS, and
- where a smaller service provider is involved, up to several months could be saved.

We cannot monetise these time savings. However, we are confident that time savings generate cost savings, as per the saying, "time is money".

Estimated cost savings based on NZTA's experience

NZTA's adoption of national pavement and bridge standards reduced average design costs

[41] https://www.rnz.co.nz/news/politics/593170/the-49-billion-cost-of-fixing-water-infrastructure-woes-laid-bare

by 10 – 15% and improved contractor confidence in tendering.

We estimate design costs alone could comprise 5% to 15% of the project budget.

- Of the $49 billion in expected water services investment in the coming decade, we estimate engineering design could cost $2.45 billion (5%) to $7.35 billion (15%) if no change is made.
- If a 10 – 15% saving on design costs can be realised, New Zealand would save $0.245 billion to $1.103 billion over ten years.
- Taking midpoints of $4.9 billion and 12.5%, savings of $0.613 billion would be expected.

Conclusion: NEDS could realise benefits in planning and design

- We expect significant gross cost savings to be possible in planning and design over a ten-year period. Further, significant reductions in time taken to plan, design and obtain approvals will decrease project risk and reduce costs.
- There are different ways of calculating cost savings estimates. Relying solely on the routine renewals or greenfields case studies is likely to overstate the possible cost savings, as these projects tend to be less complex and therefore lend themselves to standardisation more easily. NEDS are less likely to generate significant cost savings in the planning, design and approvals phase of highly complex projects.
- The estimated benefits look large but they are spread across ten years and many projects. It is possible some projects will notice close to no change, while others may notice reasonable cost reduction. The inverse may be true if thresholds and requirements are "gold-plated" and much more stringent than current practice.
- Benefits would build over time as designs consistent with NEDS and Codes were developed and then replicated. It may be that costs are incurred in the first instance in developing compliant designs. We were unable to estimate costs of this nature.

Phase 2. Acquisition and build

Standardisation allows for economies of scale to be realised in product manufacturing and process deployment, both of which should result in cost reduction. It also allows for the codification of best practice, which should result in benefits optimisation, even if upfront costs are higher in some cases.

To quantify cost impacts in this phase we would need to understand:

- The exact thresholds or requirements. Without this it is impossible to estimate the impact on build costs. NEDS may require some water services providers to improve their practices which could entail incurring greater costs in this phase. If costs were to increase, this would be to realise additional benefits, e.g. to ensure greater reliability, resilience, environmental protection, etc.
- The impact on competition from NEDS and Codes and, assuming competition is strengthened by more firms being able to offer services in more areas, the effect this would have on prices.

There is some evidence that standardisation can reduce construction costs.

KiwiRail achieved significant savings in construction by standardising its bridge replacements

The following is reproduced from the Engineering NZ[42] website:

In 2021, a typical bridge span cost approximately $300,000 per metre and could take between three to five years to deliver after being identified as end-of-life, which is an unsustainable model. In response, KiwiRail launched a modernisation programme aimed at making bridge delivery more structurally efficient, cost-effective and faster. The first step was harmonising design standards, transitioning from American (AREMA) to New Zealand and Australian rail/road standards. By adopting and tailoring the AS5100 load model to suit New Zealand's rolling stock and future requirements, KiwiRail achieved a 40 percent improvement in design efficiency.

To illustrate: the new standardised deck design uses 30 percent less concrete, features a shallower construction depth (providing greater headroom without raising track levels), eliminates the need for complex post-tensioning, and maintains the same span capabilities as previous designs. These concrete bridge spans are also designed for delivery via KiwiRail's own network, maximising internal logistics and reducing road congestion.

KiwiRail costs for steel span bridges have reduced from close to $300,000 per metre to below $140,000 per metre. While material costs remained constant, the industry benefitted from a clear understanding of KiwiRail's bridge replacement approach, enabling more efficient planning and execution.

Kāinga Ora used standardisation to reduce build costs

Kāinga Ora developed a suite of standardised house designs (also known as optimised plans) for new single-level and double-storey homes in a range of sizes.[43] This enabled it to deliver new homes quickly and cost-effectively. This saved design time, but construction is standardised, repeatable and therefore faster too.

Changes include simplifying the homes' internal layout, reducing construction complexity; using fewer cladding types on exterior walls; and introducing standardised sizing for walls, floor, cladding and windows to match available material dimensions.

[42] https://www.engineeringnz.org/news-insights/fast-tracking-bridge-construction/

[43] https://kaingaora.govt.nz/assets/News/Media-centre/Information-sheet-on-standardised-design-plans.pdf?v=553a1fa8165e7ebdc382469ce604bee4cb3029fd

The average build cost in FY24 was $3,473. The move to new standardised house plans and other transformation work means Kāinga Ora is on track to meet and exceed its $2,980 per square metre target by the end of FY26 – a 14% reduction.

Lessons from GHD's case studies

GHD's case studies suggest that establishing NEDS would be relatively unlikely to reduce costs or project duration in this phase where projects are complex. Further, NEDS will not help at all with steps like obtaining land access.

However, standardising materials, specifications and construction practices would probably achieve small benefits, particularly in making procurement more efficient, and reducing uncertainty and rework. For the "greenfields" case study, GHD estimated cost savings of 5 – 10% may be possible, achieved by reducing transaction costs, lowering the risk of variations being needed, and allowing for more efficient procurement.

If we extrapolate that saving across the whole investment programme and acquisition and build costs are $9.8 billion over the next ten years (the midpoint of 10 – 30% of $49 billion), savings of $0.49 billion to $0.98 billion may be possible over this period. In reality, the "acquisition and build" portion of the $49 billion in planned capex could be a lot higher (as operations and maintenance costs tend to be opex), meaning the benefits of NEDS could be higher too.

Lessons for NEDS and water infrastructure

The GHD case studies suggest we cannot assume the benefits achieved by KiwiRail and Kāinga Ora in building infrastructure can be replicated through standardising engineering design for water infrastructure.

It is important to consider what drove savings for these entities. For example, one big driver of cost savings for KiwiRail was reduced material requirements (around 30% less concrete for some bridge spans). It is unclear that savings of this nature could be realised in many types of water infrastructure. Similarly, KiwiRail promoted automation and off-site manufacturing, aiming to produce as many components as possible in controlled environments to improve quality and reduce on-site complexity. It is unclear the extent to which these types of efficiencies could be used for water infrastructure.

Other types of cost savings are likely to be replicable, for example, reduced delivery risk for contractors, reusable construction methodologies, and standard components that could be manufactured with greater scale and repetition.

We would expect the highest cost savings to be achieved where there is a high degree of repeatability, for example, in building subdivision water mains and standard pump stations. Where more complexity and site-specificity is required, savings in build costs may be less forthcoming.

Conclusion: Savings in build costs are expected but the level is unclear

- The research suggests cost savings in this phase are likely but to a lesser degree than for other types of infrastructure.
- We expect the impact of NEDS on build costs to vary around New Zealand, with the impact depending on the state of existing infrastructure, existing requirements, and the specific performance requirements codified in the NEDS.
- In sum, standardisation can clearly bring some benefits but will compete with a possible need to raise standards in parts of the country, which will put upward pressure on costs. Overall, we expect the cost savings in the build phase to be low to moderate. We note that even a small percentage saving in build costs in the context of a multi-billion-dollar ten-year programme is significant.

Phase 3. Operations and maintenance

This phase can contribute the largest portion of total lifecycle cost, with asset lives of typically 50 years for above ground infrastructure and as much as 100 years for below ground. By definition, it is treated as operating expenditure for accounting purposes. The Infrastructure Commission has not reported on the national operating cost of water services (in contrast to capex). However, opex will be material and of the same order of magnitude as capex, that is, in the order of tens of billions of dollars over the coming decade.

It is important to note the relationship between operations and maintenance costs and whole of life cost. Non-standard and ineffective approaches to maintenance (and renewals) can result in big costs including higher capex costs as is widely evidenced across New Zealand when infrastructure fails.

Operating costs come from energy use, labour, chemicals and consumables, parts and materials, and costs involved in managing residuals and waste. The percentage that each of those five components can contribute to total operating cost can vary within a very wide range.

Operations and maintenance can include a number of secondary drivers of cost such as monitoring and compliance costs, administration and overhead costs, and network operation costs (like leak detection and pressure management). These secondary drivers may be grouped under the umbrella of operations and maintenance or may not. Organisations use different ways of recording costs, and group different costs together within their financial management information systems.

Standardisation could conceivably help reduce cost in some of these areas, with the usual caveat that the specific requirements codified through NEDS will be material in determining cost impacts.

It is important to reiterate that NEDS are intended to take a lifecycle perspective on water infrastructure and are thus likely to influence operations and maintenance costs over very long periods of time in a way that current council Codes do not.

Energy efficiency

Across water services, energy[44] is heavily concentrated in a small number of activities including:

- pumping and distribution systems (often the largest share)
- aeration can account for up to 75% of energy use in wastewater treatment, and
- treatment processes (mixing, UV, membrane systems).

Electricity costs are the largest "controllable" operating costs for most wastewater utilities, and international experience indicates cost reductions of as much as 20 to 40% are feasible through improved efficiency of energy use.[45]

It is unclear how much NEDS and Codes will directly affect the energy efficiency of water services infrastructure. The World Bank reports that energy costs can equate to up to 82% of non-labour operating costs for water services. Even a small improvement in energy efficiency as a result of NEDS could be material when aggregated to a national level.

Labour

NEDS and Codes will not impact labour costs directly, meaning they will not set wages.

However, standardisation can reduce labour costs over the lifecycle of infrastructure in the following ways:

[44] See: https://www.mdpi.com/1996-1073/16/5/2433 and https://www.watermagazine.co.uk/2024/06/03/driving-wwtp-efficiency-delivers-on-energy-costs/

[45] https://www.worldbank.org/en/topic/water/publication/energy-efficiency-investments-in-urban-water-and-wastewater-utilities

- achieving productivity gains as standardised work reduces variability and inefficiency, eliminates unnecessary steps, reduces task time, and encourages efficiency through task repeatability
- reducing rework and error-related labour, thus reducing avoidable labour costs
- lowering training and onboarding costs (after an initial transitional period)
- potentially reducing the need for some types of operating, maintenance, and repair costs, thus saving labour cost, and
- improving planning and scheduling efficiency.

A number of these points were reinforced by the GHD case studies. It is important not to overstate the likelihood of cost reductions in labour for the following reasons:

- The workforce would be more transferable, and therefore more likely to relocate if higher wages (and standard of living) can be sought in other jurisdictions. This competition for labour would put upward pressure on wages.[46]
- Engineering is a skilled profession, where practitioners can apply their craft around the world. A great level of skills is needed to work on water services infrastructure and a commensurate level of remuneration is reasonable.

Ultimately, labour is a major driver of opex and even a small improvement in labour productivity or cost reduction could be material at a national level.

Chemicals and consumables

Static or inconsistent dosing systems can waste 15–30% of chemicals due to poor control. Real-time optimisation methods (which effectively standardise dosing logic) can reduce chemical overuse by 20–40%. Advanced disinfection control systems can reduce chemical consumption by 20–50% depending on variability.[47]

Water service providers are (financially) incentivised not to overuse chemicals currently but may do so where operating on the side of caution (where risks of underuse exceed risks of overuse).

Ultimately, it is in the interests of all parties for chemicals to be administered in the right quantities.

NEDS and Codes should set clear expectations around dosing, as well as the control systems and monitoring needed to support correct dosing.

Parts and materials

This report talks extensively about fragmented standards driving a need for duplicated inventories, procurement inefficiency, and supply chain complexity. We expect standardisation to reduce these pressures.

Standardisation should result in:

- lower cost to produce materials through realisation of economies of scale
- certainty for investment knowing there is a national market to sell into (rather than a localised market)
- lower inventory holding costs
- less obsolescence
- simpler supply chains
- simpler procurement utilising consistent specifications and realising aggregation of demand across entities (e.g. bulk purchasing, standard supplier contracts), and

[46] We also note it would help best practice spread around the country.

[47] https://hydropurewater.com/blog/134-ai-chemical-dosing-optimization-engineering-specs-costs-real-world-roi-2025-guide.html

- fewer incorrect parts orders and better forecasting of part failures and replacement cycles.

GHD's case studies reinforced many of these points.

It is important to note that NEDS and Codes may put upward pressure on the unit cost of some materials to achieve higher performance in domains like resilience, reliability and environmental protection. Further, there could be transition costs in adjusting to the new requirements that may include replacing existing inventory or writing off legacy stock. Third, the market will need to be able to provide more standardised parts at a scale that can service the nation. This may take time to develop, with the risk that constrained supply in the short term could put upward pressure on prices.

It is important to note that parts and materials will be subject to global supply chains which can be disrupted and impose costs well outside the direct control of the New Zealand government.

We consider it likely that standardisation will help put downward pressure on the cost of parts and materials but the domestic market may take some time to fully mature to enable the benefit to be realised with potential impacts for local manufacturers unable to compete at scale.

Residuals and waste

Wastewater standards largely deal to this matter and we consider it unlikely that additional benefits will be gained from NEDS and Codes. Residuals management (biosolids discharge, reuse, disposal) is explicitly regulated under these standards. The standards reduce bespoke consenting requirements and duplicated technical assessments (for example, sludge disposal pathways).

Further lessons from case studies

As noted, GHD's case studies reinforced a lot of the points made above. Overall, GHD's professional judgement suggests operations and maintenance costs could be reduced through standardisation:

- The "large upgrade" case study found standardisation could "reduce maintenance costs and fault response effort by approximately 10% while also lowering whole-of-life operating costs through lifecycle efficiencies achieved via improved operational performance".
- The "greenfields" case study found "operational and maintenance costs may be reduced by approximately 10 – 20% through lifecycle efficiencies, procurement benefits and more consistent maintenance practices".
- The "smaller service providers" case study found a "5 – 15% reduction in whole-of-life operation and maintenance costs could be expected for smaller councils".

We do not know how much councils intend to spend on opex over the next ten years to estimate a nationwide impact from potential efficiencies in operations and maintenance. However, it is likely in a similar order of magnitude to the planned capex spend, that is, in the tens of billions over the coming decade. Savings as suggested by the GHD case studies are therefore significant.

Conclusion: Standardisation could lower operations and maintenance costs

- GHD's case studies suggest significant savings could be achieved in operations and maintenance costs.
- We expect standardisation could put some downward pressure the costs of energy use and labour. KiwiRail's experience with standardisation shows savings were achieved from reusable construction methodologies, off-site manufacturing and reduced contractor risk. Standardisation should also save time which generally saves money, even if the benefit is hard to quantify.
- The impact of standardisation on some cost drivers is unclear. Standardisation could reduce the costs of chemicals and consumables by encouraging correct dosing, but it is unclear how much overuse occurs currently. Third, standardisation can put downward pressure on the cost of parts and materials (depending on where performance requirements are set, noting that higher financial cost would generate other benefits). However, we could expect transition costs as the market adjusts to producing and using new products. There are also factors outside the control of the New Zealand government that impact the price of goods.
- We expect standardisation to have little impact on the cost of residuals and waste.
- Finally, it is important to note that the relationship between operations and maintenance costs and whole of life cost. Non-standard and ineffective approaches to maintenance (and renewals) can result in big costs as is widely evidenced across New Zealand when infrastructure fails.

Phase 4. Renewal, upgrade and disposal

Investment is generally driven by the need to renew infrastructure, the need to accommodate growth, or the need to improve the level of service. A project can be driven by more than one need.

Standardisation achieves greatest benefit where work involves a high volume of repeatable tasks using common components. It is least effective where assets are unique and design is driven by site-specific constraints.

For these reasons, standardisation delivers the largest cost and productivity benefits for renewals, moderate but still meaningful benefits for growth investment, and more limited (and sometimes mixed) effects for improved levels of service, where bespoke designs are most common.

Renewals comprise the biggest portion of forecast capex in the coming decade. Renewals entail replacing like-for-like assets and lend themselves to using highly repeatable designs. They are ideal for standardisation. The Infrastructure Commission has identified New Zealand as being amongst the highest in the world per capita for infrastructure spending, while having a significant renewals backlog. Introducing NEDS and Codes at a point where future capex is dominated by renewals means NEDS and Codes are likely to yield more benefit in the next decade.

GHD expects time savings from NEDS to accrue to renewals projects.

Growth involves extending existing networks (for example, new subdivisions). It uses a mix of repeatable elements and site-specific factors (topography, staging). Standardisation can help with the former, for example, connection and extension designs and faster consenting and approvals (if Codes are used). The latter includes site-specific routing and developer-led variation, where standardisation is of limited benefit.

Level of service investment, by definition, involve upgrading to comply with higher standards. Bespoke engineering solutions can be necessary to this end. There can be unique consent requirements and site-specific conditions to navigate. This can generate a need for customisation. While efficiency gains will be made to some degree (for example, in procuring the materials used), standardisation will not help to the same degree in other areas.

Decommissioning costs are driven by infrastructure complexity, the presence (or not) of hazardous materials and regulatory requirements. NEDS and Codes should reduce infrastructure complexity (or at least codify it). Standardisation should help reduce the cost of asset disposal through reducing the complexity of consenting and providing for repeatable processes which should reduce engineering and planning cost.

Conclusion: Standardisation is more likely to reduce the cost of some capex projects

- Standardisation achieves greatest benefit where work involves a high volume of repeatable tasks using common components. It is least effective where assets are unique and design is driven by site-specific constraints.
- For these reasons, we expect standardisation to deliver the largest cost and productivity benefits for renewals, moderate but still meaningful benefits for growth investment, and more limited (and sometimes mixed) effects for improved levels of service, where bespoke designs are most common.

Costs

The phase-by-phase analysis focuses on the NEDS once they have been implemented on a business-as-usual basis. This looks relatively beneficial and therefore underplays costs. We expect transitional and implementation costs to be incurred by actors in adjusting to the new requirements. These costs include:

- Establishment and development costs: the costs to the WSA of developing NEDS and National Codes of Practice, including consultation requirements and technical drafting.
- Ongoing review and maintenance costs: the costs to maintain, update (at least periodically), and refine NEDS and Codes.
- Implementation and transition costs for water service providers: the costs to adjust internal processes, standards, asset management systems, and procurement practices to align with national standards.
- Compliance costs (including training and capability uplift): the costs for engineers, contractors, and staff at water service providers to understand and apply NEDS and Codes of Practice.
- Reduced flexibility in some cases: potential costs where national standardisation constrains locally tailored solutions or requires redesign of locally optimised approaches.
- Change management and system integration: the costs to align bylaws, council plans, consenting processes, and asset transfer/vesting arrangements with NEDS framework.

Summary of benefits and costs

Table 17: Summary of benefits

Phase	Description	Impacts
1 Planning and design	Identify service needs, assess options, undertake investigations, develop business cases, complete concept and detailed design, secure approvals and consents, procure services, and prepare assets for construction.	**We expect significant, ongoing savings to be achievable in this phase if NEDS are established. The impact analysis (incorporating the case studies) suggests significant cost savings are possible, potentially well over $1 billion over a ten-year period.** There are different ways of calculating the potential cost savings from standardisation. • If the savings suggested by the "routine renewals" case study are extrapolated to the whole investment programme, the benefits fall within a range of $0.98 billion and $3.92 billion, with a midpoint of $2.45 billion over ten years. • If the savings suggested by the "greenfields" case study are extrapolated to the whole investment programme, cost savings of around $1.8 billion would be expected over ten years. • Estimating cost savings based on NZTA's experience of adopting national pavement and bridge standards suggests New Zealand would save $0.245 billion to $1.103 billion over ten years, with a midpoint of $0.613 billion. Relying solely on the routine renewals or greenfields case studies is likely to overstate the possible cost savings, as these projects tend to be less complex and therefore lend themselves to standardisation more easily. NEDS are less likely to generate significant cost savings in the planning, design and approvals phase of highly complex projects. GHD's case studies also show establishing NEDS could reduce the time needed to plan, design, and obtain regulatory approvals for a project by up to six months, depending on the project.
2 Acquisition and build	Procure materials, equipment and contractors; construct, install and commission infrastructure; manage project delivery, quality, health and safety, environmental controls, and handover of completed assets.	**We expect significant, ongoing savings to be achievable in this phase if NEDS are established. The impact analysis (incorporating the case studies) suggests cost savings from standardisation of 5 – 10% are possible in this phase.** GHD's case studies suggest that standardising materials, specifications and construction practices would probably achieve small benefits, particularly in making procurement more efficient, and reducing uncertainty and rework. For the "greenfields" case study, GHD estimated cost savings of 5 – 10% may be possible, achieved by reducing transaction costs, lowering the risk of variations being needed, and allowing for more efficient procurement.

Phase	Description	Impacts
		If we extrapolate that saving across the whole investment programme and acquisition and build costs are $9.8 billion over the next ten years (the midpoint of 10 – 30% of $49 billion), savings of $0.49 billion to $0.98 billion may be possible over this period. Much greater benefit may be possible if the "build" component of the $49 billion in planned investment is higher (noting operations and maintenance costs are generally opex). KiwiRail and Kāinga Ora achieved larger cost reductions through standardisation. However, these entities had drivers of cost savings which may not be replicable in water infrastructure. For example, KiwiRail reduced concrete use by 30% in bridge spans. It is not clear that a similar reduction in material inputs could be achieved through NEDS. We expect the impact of NEDS on build costs to vary around New Zealand, with the impact depending on the state of existing infrastructure, existing requirements, and the specific performance requirements codified in the NEDS.
3 **Operations and maintenance**	Operate assets to deliver services; monitor performance, undertake inspections, maintenance and repairs; manage energy, chemicals, labour, compliance, waste, renewals planning and asset information.	**GHD's case studies suggest significant, ongoing savings could be achieved in operations and maintenance costs. Across the case studies, GHD estimates 5 – 20% of operations and maintenance cost could be saved through standardisation**, depending on the characteristics of the project. We do not know how much councils intend to spend on opex over the next ten years to estimate a nationwide impact from potential efficiencies in operations and maintenance. However, it is in a similar order of magnitude to the planned capex spend, that is, in the tens of billions over the coming decade. Savings as suggested by the GHD case studies are therefore significant.
4 **Renewal, upgrade and disposal**	Replace end-of-life assets, increase capacity or levels of service, rehabilitate infrastructure, decommission obsolete assets, recover or recycle materials where appropriate, and safely dispose of residual infrastructure.	**We expect standardisation to deliver the largest cost and productivity benefits for renewals, moderate but still meaningful benefits for growth investment, and more limited (and sometimes mixed) effects for improved levels of service, where bespoke designs are most common**. This is because standardisation achieves greatest benefit where work involves a high volume of repeatable tasks using common components. It is least effective where assets are unique and design is driven by site-specific constraints.

Table 18: Summary of costs

Cost	Description	Comment
Establishment and development costs	The costs to the WSA of developing NEDS and National Codes of Practice, including consultation requirements and technical drafting	By definition, a one-off cost. Much would be absorbed by WSA staff within baselines. External support may extend into seven figure sums.
Ongoing review and maintenance costs	The costs to maintain, update (at least periodically), and refine NEDS and Codes which will primarily fall to the WSA	Ongoing monitoring and regulatory stewardship will be absorbed by the WSA within baselines. Periodic reviews and updates of the NEDS may require costs no higher than establishment and development costs and will depend on how widely the reviews are scoped.
Implementation and transition costs for water service providers	The costs to adjust internal processes, standards, asset management systems, and procurement practices to align with national standards	These costs are of a moderate order of magnitude compared to benefits. Actual costs and cost realisation timeframes will depend on the final form of NEDS and Codes and the implementation approach adopted.
Compliance costs (including training and capability uplift)	The costs for engineers, contractors, and staff at water service providers to understand and apply NEDS and Codes of Practice	These costs are of a moderate order of magnitude compared to benefits. Actual costs and cost realisation timeframes will depend on the final form of NEDS and Codes and the implementation approach adopted.
Reduced flexibility in some cases	Potential costs where national standardisation constrains locally tailored solutions or requires redesign of locally optimised approaches	It is hard to comment on the size or likelihood of this potential cost. The NEDS framework provides for alternative solutions where useful. The final form of NEDS and Codes will be instrumental in determining the nature of this cost.
Change management and system integration	The costs to align bylaws, council plans, consenting processes, and asset transfer/vesting arrangements with NEDS framework	These costs are of a moderate order of magnitude compared to benefits. We note the local government planning system is being completely revised by the resource management reforms so council plans and approaches to consenting will change in any event.

Summary of distributional impacts

Table 19: Summary of distributional impacts

Affected group	How they are affected (preferred option vs status quo)	Description of level of impact(s)
Water service providers (including new entities)	• Required to comply with NEDS and align internal standards and processes • Required to accept designs that comply with National Codes, and may develop or approve alternative approaches that also meet the NEDS • Need to assess alternative solutions for how well they comply with the NEDS • Potential upfront transition and implementation costs, alongside wider transitional costs associated with general system reform	**Net positive over time** • Short-term costs (system change, training) • Short-term benefit for joint water services organisations in NEDS providing an easy way to align standards across council jurisdictions • Medium–long term efficiency gains (reduced design variation, faster approvals) • Subject to where standards are set, we expect strong benefits in resilience, reliability, and quality of service provision
Local authorities (residual role)	• Reduced role in developing local engineering design standards, that is, less influence • Transitional adjustment where responsibilities shift to (non-council) water services providers • Reduced resourcing burden, meaning resources can be used for more valuable activities • Must update bylaws and council plans (in the context of the reform of the planning and natural environment system requiring substantial change in any event) • Clear standards that can support other regulatory activity, for example, approvals under the Natural Environment Act	**Moderate (transitional costs, ongoing benefits)**
Developers, infrastructure providers, and contractors	• Greater clarity and predictability in design requirements nationally – design cost savings may be passed through to developers • Reduced transaction costs from dealing with requirements that differ across council jurisdictions • Potential to realise economies of scale and compete in more regions	**Positive (moderate to high)**

Affected group	How they are affected (preferred option vs status quo)	Description of level of impact(s)
	• New regime supportive of staff mobility • Reduced labour costs from ability to standardise practices, reduced rework, etc • Potential initial learning costs and need to align design practices	
Water engineering consultants and designers	• Streamlined design processes and reusable specifications • Greater portability of skills and ability to compete for work across regions • Reduced need to tailor designs for multiple local standards	**Positive (significant)** • Designs will be able to be used across council jurisdictions with confidence. This reduces the need to redesign infrastructure to meet similar needs. • There will be transitional impacts, but the process of infrastructure design should become more efficient over time.
Providers of infrastructure construction materials	• Construction products will need to meet the requirements of NEDS. This may entail transition costs. However, these costs are met with certainty that the products could be used anywhere in New Zealand. • Ability to reduce costs by realising economies of scale, producing for a nation (rather than sub-national) market	**Positive (moderate)** • Construction product manufacturers will be able to produce products in greater volumes (to serve the country instead of individual regions
Regulators (the WSA and regional councils)	• Clear, enforceable baseline for monitoring and compliance • Improved ability to assess performance against national benchmarks • Need to bear the costs if establishing and regularly reviewing the NEDS and codes regime	**Positive (moderate)**
Communities and users of water services (general public, households)	• Improved long-term reliability, resilience, and safety of infrastructure • Potential indirect cost impacts (passed through via charges). Many costs will be reduced, e.g. administration costs, design costs, etc. However, capital expenditure may rise for some projects, depending where the quantitative performance-based standards are set. • Benefits from more consistent service quality nationally	**Positive (moderate, long-term)**

Affected group	How they are affected (preferred option vs status quo)	Description of level of impact(s)
Māori (iwi, hapū, mana whenua)	• Potential for improved protection of environmental and cultural outcomes where standards embed appropriate design expectations • Risks if national standards do not provide flexibility to enable the exercise of kaitiakitanga, tikanga and mātauranga Māori • Opportunities to influence standards through engagement • The benefits for communities and users of water services will also apply to Māori communities	**Mixed (high importance; distributionally significant)**
Central government (policy and funding agencies)	• Supports achievement of national policy objectives (consistency, efficiency, resilience) • Limited direct fiscal impact beyond and funding support provided for NEDS establishment	**Low to moderate positive**
Small providers and marginal or rural entities	• Greater clarity • Costs of maintaining updated Codes are passed to central government • Risk of bespoke local Codes becoming neglected and out of date is avoided (with the WSA legally obliged to periodically review NEDS) • Risks such as potentially disproportionate compliance costs relative to scale • May face challenges meeting standards without support or flexibility (for example, the alternative solutions pathway)	**Positive (noting risks and challenges can be mitigated)**
Future consumers / intergenerational impacts	• Improved asset durability and reduced lifecycle costs • Reduced risk of system failure and associated social/environmental harm	**Positive (high, long-term)** • Even if monetised costs (water charges) are higher, there will be a corresponding improvement in level of service

Part 5: Implementation and next steps

Implementation considerations and next steps

We have proposed implementation over three stages

Developing and implementing NEDS will be a significant regulatory and technical programme. The first edition does not need to resolve every detailed requirement or Code pathway upfront. However, it does need to establish a coherent framework, develop detailed requirements and Codes in priority areas, and prepare the sector for implementation.

We recommend implementation over three broad stages:

1. **Test the framework and prioritise the first edition:** test whether the proposed framework works in practice, refine it with the sector, and confirm which requirement areas and Code pathways should be developed first.
2. **Develop requirements and compliance pathways:** draft the detailed NEDS requirements for priority areas, including functional requirements, performance requirements, evidence expectations and supporting Code pathways where justified.
3. **Prepare the system for implementation and stewardship:** prepare the wider regulatory and delivery system to apply NEDS, including transition from local standards, alignment with bylaws and related tools, sector guidance, monitoring and future updates.

These stages will overlap. For example, work on sector readiness and transition could begin while detailed requirements and Codes are being developed. Similarly, prioritisation may need to be revisited as technical development, consultation and implementation planning progress.

1. Test the framework and prioritise the first edition

The first stage should test whether the proposed NEDS framework works in practice and confirm what should be included in the first edition.

This stage should focus on the overall architecture of the framework, rather than detailed technical thresholds. The WSA should test and confirm whether the relationship between performance domains, common objectives, requirements, Codes of Practice and alternative solutions is understandable and workable across water supply, wastewater and stormwater.

This stage should include:

- Testing worked examples across different water services, infrastructure types and lifecycle points
- Testing how the framework applies to new infrastructure, renewals, upgrades, connections and vesting
- Engaging with water service providers, councils, developers, contractors, designers, technical experts and tangata whenua
- Identifying where the framework is clear, where it may create confusion, and where early national direction would add most value
- Confirming the approach to infrastructure classification and proportionate application
- Applying the prioritisation approach to identify first-edition requirement areas and code pathways.

The key output from this stage should be a refined framework and a clear first-edition work programme. That work programme should identify:

- Requirements and Code pathways to develop first
- Areas to signal for later development
- Areas that need further technical investigation before decisions are made
- Key transition and implementation issues to manage.

2. Develop priority requirements and compliance pathways

The second stage should turn the framework into draft NEDS requirements and supporting compliance pathways.

The WSA's role in this stage is to make the technical and regulatory decisions needed to translate common objectives into clear and assessable requirements. For each priority area, this means deciding:

- What infrastructure, activity or lifecycle point the requirement applies to
- What function the infrastructure must perform
- What performance benchmark must be met
- How performance will be measured or demonstrated
- Whether the requirement should be nationally fixed, use local inputs, vary by classification, or use a combination of these approaches.

Codes of Practice should be developed where a recognised pathway would reduce inconsistency, cost, delay or uncertainty, and where the technical approach is settled enough to codify.

This stage should also include a review of existing standards, local Codes of Practice, sector guidance and the NTU drafts to identify material that can be reused or adapted. This will help avoid starting from scratch where there is already credible technical content, while ensuring any reused material is tested against the NEDS framework and aligned with the final requirements.

This stage should produce:

- draft first-edition NEDS requirements for priority areas
- priority National Codes of Practice, where justified, and
- worked examples, templates and methods where needed.

This is the stage where the WSA will need to make explicit decisions about the performance bar, including whether the proposed level of performance is justified by the issue being managed.

Key questions for the first round of consultation

This round of consultation should focus on the core design and implementation questions that need to be resolved before detailed drafting. Key questions to test include:

- Whether users understand the relationship between objectives, requirements, Codes of Practice and alternative solutions
- Whether the framework works across drinking water, wastewater and stormwater
- Whether the performance domains cover the main areas of infrastructure performance without duplicating other regimes
- Where early national direction would make the greatest difference to consistency, cost, delay, redesign or uncertainty
- Where National Codes of Practice would provide the most value
- How National Codes of Practice should be structured within each water-specific Code – by component, lifecycle or a mix
- How the framework should manage variation, including national requirements, local inputs and infrastructure classification
- How Māori rights and interests should be reflected where they intersect with infrastructure performance.

3. Prepare the system for implementation

This third stage focuses on integrating the NEDS into the wider regulatory and delivery system and preparing for implementation.

During this stage, the WSA's role is to support the sector to implement the NEDS by reviewing existing standards, planning frameworks, and bylaws, and by providing guidance on how the framework will operate in practice.

This stage is likely to involve the following activities:

- Review affected standards (e.g. NZS4404 and other sector standards) to determine whether they should be updated or referenced
- Consider how the NEDS will interact with district plans and emerging spatial planning processes, including alignment with resource management reform and regional spatial plans expected from 2027–28
- Consider the needs of end-users of NEDS and codes, as a basis for how material is provided including the potential use of platforms to make the information easy to find and apply to a specific need
- Continue development of Codes of Practice to support rollout
- Clarify how the NEDS will connect to local bylaws and existing approval processes
- Develop implementation guidance and support for water service providers and councils
- Consider how existing local codes will transition to the NEDS framework.

Legislative requirements

Consulting on the draft NEDS and Codes of Practice

The WSA is responsible for leading consultation on the development and ongoing update of the NEDS and Codes of Practice. The process for consultation is set out in the Water Services Act 2021. This applies to updates of both the NEDS requirements and the national Codes of Practice.[48]

Before recommending that NEDS are put in place through regulations, the WSA must consult with key parties across the sector. This includes:

- Water service providers
- Industry representative bodies
- The Commerce Commission
- Relevant central government agencies involved in water infrastructure.[49]

The WSA's statutory operating principles also require early and meaningful engagement with tangata whenua.

Given the role of NEDS, the WSA may also plan to consult broader than the statutory requirements above. This may include:

- Developers and contractors
- Designers and technical specialists
- Asset managers
- Other affected users of the framework.

The consultation process must provide clear information on the proposed standards, give stakeholders a reasonable opportunity to provide feedback, and ensure that this feedback is properly considered before decisions are made.[50]

48 Section 97J, Water Services Act 2021.

49 Section 97E, Water Services Act 2021.

50 Section 97E, Water Services Act 2021.

The WSA must follow the same approach when developing or updating national Codes of Practice that support the NEDS.

The WSA is not required to consult on proposed updates to the NEDS if the proposed update needs to be made urgently for safety reasons, or if it "contains only minor amendments that will not adversely and substantially affect any person's interests".[51]

Making regulations to give effect to the NEDS and Codes of Practice

The WSA is responsible for progressing the NEDS through the process required to give them legal effect.

Once development and consultation are complete, the WSA may recommend to the Minister that the NEDS be issued through regulations.[52] This follows standard government processes, including Cabinet approvals, drafting, and formal enactment.

The WSA can also issue national Codes of Practice directly by publishing them in the *Gazette*.[53]

Looking ahead: Monitoring, evaluation and review

While these activities will become more important as the NEDS regime matures, it is important for the WSA to have a clear understanding of its monitoring, evaluation, and review responsibilities from the outset as part of good regulatory stewardship.

The Water Services Act states that the WSA may review and update the NEDS at any time, but must review and update the NEDS at least every ten years.

- **Monitoring** should focus on practical indicators such as how widely the NEDS are used, the level of consistency in design approaches, infrastructure performance, and whether processes are becoming more efficient. This could generally use data already collected within the regulatory system, supported by stakeholder feedback where needed.
- The NEDS regime should also be periodically **evaluated** to assess whether it is delivering overall benefits. This could include examining outcomes, how well implementation is working in practice, how costs and benefits are distributed across the sector, and whether any unintended impacts arise.
- The WSA is responsible for **reviewing** and updating the NEDS. Reviews must occur at least every ten years but may happen more frequently if issues are identified or conditions change.[54] These reviews should involve engagement with sector participants, including water service providers, industry bodies, and relevant central government agencies,[55] and tangata whenua.
- In practice, monitoring, evaluation, and regular review should create an ongoing **feedback loop and continuous improvement**, allowing the NEDS and

51 Section 97G, Water Services Act 2021.
52 Section 97F, Water Services Act 2021.
53 Section 97I, Water Services Act 2021.
54 Section 97G, Water Services Act 2021.
55 Sections 97E and 97G, Water Services Act 2021.

supporting guidance to be updated and improved over time.

Appendices

Appendix 1: Legislation relating to NEDS

Water Services Act 2021

National Engineering Design Standards

Part 3 of the Water Services Act 2021 provides the key framing components of the NEDS for water services networks.

Under Subpart 1AA, the National Engineering Design Standards (NEDS) for water services networks;

a) "provides for the development, making, and ongoing review of the National Engineering Design Standards (the NEDS) that contain performance-based requirements relating to the water services infrastructure that makes up a water services network; and

4. provides for compliance with the NEDS by water service providers; and

5. provides for national codes of practice that water service providers may use to comply with the NEDS; and

b) allows water service providers to approve alternative ways of complying with the NEDS."[56]

The purpose of NEDS "is to provide for national consistency in the design, construction, and operational performance of water services networks, including by—

a) promoting the efficient and financially sustainable operation of those networks; and

b) improving the networks' reliability and resilience; and

c) protecting public health and safety; and

d) contributing to the continuous improvement of water services."[57]

The Water Services Act 2021 gives the WSA the authority to develop NEDS. Section 97D states that

2. "The NEDS must contain—

a) performance-based requirements for the design, construction, and operational performance of the water services infrastructure that makes up water services networks owned or operated by water service providers, including water services infrastructure that is proposed to be transferred to a water service provider; and

b) requirements about how water services infrastructure is to be connected to a water services network; and

c) requirements for the repair, upgrade, renewal, replacement, maintenance, and decommissioning of water services infrastructure that makes up water services networks; and

d) requirements about how information about the design, construction, and operational performance of water services infrastructure should be collected, kept, and shared.

3. The NEDS may include a requirement to use a specified method to determine whether performance-based requirements have been met.

[56] Section 97A, Water Services Act 2021.

[57] Section 97B, Water Services Act 2021.

4. The requirements in the NEDS—

    a. must specify the type of water services network to which they apply; and

    b. may apply to classes of types of water services infrastructure.

5. In addition, the requirements in the NEDS may vary in their application to different regions or districts if variations between those regions or districts (for example, geographic, climatic, and geological variations) impact the performance of water services infrastructure."[58]

Codes of Practice

The Water Services Act 2021 also enables the WSA to make national Codes of Practice.[59] These Codes of Practice would provide a means of compliance with one or more requirements in the NEDS. Section 97I(2) states that the Codes of Practice may include:

a) "technical specifications and standards for the design, construction, and operational performance of 1 or more types or classes of water services infrastructure that make up a water services network owned or operated, wholly or partly, by a water service provider:

b) detailed specifications and standards for the design and construction of water services infrastructure the ownership of which is proposed to be transferred to a water service provider:

c) detailed specifications, standards, and steps for connecting water services infrastructure to a water services network:

d) detailed specifications, standards, and steps for the repair, upgrade, renewal, maintenance, and decommissioning of water services infrastructure:

e) detailed steps and standards concerning how information about the design, construction, and operational performance of water services infrastructure is to be collected, kept, and shared with other persons:

f) any other detailed specifications, standards, and steps relating to the design, construction, and operational performance of water services infrastructure."

Alternative solutions

Section 97P enables water service providers to approve alternative solutions, so long as it acts in accordance with the relevant national COP. Alternative solutions must

a) "involve full compliance with the NEDS; and

b) be consistent with any applicable water services bylaw."[60]

Section 97P allows water service providers to approve an alternative solution. This provides flexibility to depart from standard approaches, either on the provider's own initiative or in response to an application, where the alternative can demonstrate compliance with the relevant performance requirements.

[58] Section 97D, Water Services Act 2021.

[59] Section 97I, Water Services Act 2021.

[60] Section 97P, Water Services Act 2021.

The WSA's role in developing and updating the NEDS and Codes of Practice

Sections 97D-97G and 97J set out the WSA's role when developing NEDS and Codes of Practice.

Broadly, the WSA must consult water service providers, water services industry representative bodies, the Commerce Commission, and any central government agency that is responsible for providing advice and guidance on water services infrastructure on the draft proposed NEDS.[61]

On completion of the proposed NEDS, the WSA may recommend to the Minister that the NEDS are issued by regulations made under section 200 of the Water Services Act 2021.[62]

The WSA may review and update the NEDS at any time, but are required to review and update them at least every ten years. This review includes a requirement to consult with key stakeholders set out in section 97E, unless the changes

- are urgent for safety reasons
- deal with transitional issues, or
- are minor and will not adversely or substantially affect the interests of any persons.[63]

Similarly, when reviewing and updating its Codes of Practice, the WSA must undertake consultation with the same stakeholders as the NEDS.[64]

Local Government (Water Services) Act 2025

Water services networks: Connections bylaws

Section 147 of the Local Government (Water Services Act) 2025 provides territorial authorities with the ability to make bylaws regulating connections to water services networks.

The water services bylaw should be

6. "made under section 258"; and
    a) must provide for a process for a water service provider to approve connections to water service networks."[65]

Subsection 3 specifies that this approval process must consist of the following three steps:

a) "step 1: approval of concept plans:

b) step 2: approval of engineering plans:

c) step 3: final approval and sign-off."

Section 147(5) also states that "A bylaw under this section must comply with any National Engineering Design Standards made under the Water Services Act 2021."[66]

The legislation also states "the 3-step approval process set out in a water services bylaw made under section 258 for the purpose of approving connections applies to a person who wishes to—

a) "make a connection to a water services network that is in the territorial authority's district..."[67]

61 Section 97E, Water Services Act 2021.
62 Section 97F, Water Services Act 2021.
63 Section 97G, Water Services Act 2021.
64 Section 97J, Water Services Act 2021.
65 Section 147, Local Government (Water Services) Act 2025.
66 Section 147, Local Government (Water Services) Act 2025.
67 Section 149, Local Government (Water Services) Act 2025.

Section 150 provides further details on the purpose of the 3-step approvals process that regulates connections to a water services network. The legislation states that "a water services bylaw… must specify that—

7. step 1 of the approval process is to enable the water service provider to be satisfied that the relevant network has capacity for the proposed activity; and

8. step 2 of the approval process is to enable the water service provider to be satisfied that, based on detailed engineering plans, the proposed activity can be implemented; and

a) step 3 of the approval process is to enable the water service provider to be satisfied that, based on inspections of completed works and supporting documentation, the work has been completed to an acceptable standard and in accordance with the approvals granted under steps 1 and 2."[68]

[68] Section 150, Local Government (Water Services) Act 2025.

Appendix 2: The wider water services regulatory framework

The NEDS will be one part of the wider water services regulatory framework

The NEDS will sit within a broader water services regulatory system, as shown in Figure 5.

An overview of the current water services regulatory system – who does what?

Water quality regulation sets the public health and environmental bottom lines for water supply, wastewater and stormwater.

The water services regulatory system in New Zealand involves multiple agencies with complementary roles across setting, applying, overseeing, and delivering water services infrastructure.

- **The Water Services Authority – Taumata Arowai** is the water services quality regulator. As shown in further detail in the following section, it sets national standards, including the NEDS, regulates drinking water safety, oversees the performance of wastewater and stormwater networks, and provides system-level oversight of compliance across the water services system.
- **Water service providers** are responsible for managing and delivering the safe provision of water across New Zealand. They lead maintenance, renewals and upgrades on their networks.
- **Territorial authorities** provide local governance through ownership of the water service providers and by setting water services bylaws. These bylaws must give effect to the NEDS and set the processes water service providers follow to inspect and approve infrastructure.
- **Regional councils** administer the resource management system and regulate environmental effects, including discharges.
- **The Ministry of Cities, Environment, Regions and Transport** (MCERT) provides stewardship for the overarching legislation and monitors the WSA. It also leads the oversight and policy functions for the water services and local government systems.
- **The Commerce Commission** will provide economic regulation and oversight to ensure that water supply and wastewater services infrastructure and services are cost-effective and efficient for consumers.
- **Developers and contractors** design and build the new infrastructure, including greenfield and brownfield development, and maintenance and renewals.
- **The Ministry of Health** has a role advising on drinking water quality standards.

Overarching role of the WSA

Within this system, the WSA has a central role as the water services quality regulator. It is responsible for setting and enforcing national standards, monitoring performance, and supporting compliance across water supply, wastewater and stormwater systems.

The WSA has specific roles across water services

Water supply

In its role as drinking water quality regulator, the WSA regulates suppliers to ensure that water is safe to drink. It does this by setting and enforcing

Drinking Water Standards and aesthetic values, Water Quality Assurance Rules, and its development of Acceptable Solutions and verification methods for compliance with standards. These tools set the requirements that drinking water must meet and provide recognised ways for suppliers to comply with those requirements.

The WSA also maintains a register of drinking water suppliers and requires suppliers to implement drinking water safety management frameworks. It monitors compliance with these requirements and uses a graduated compliance toolkit, including guidance, improvement notices, compliance orders, infringement fees, and prosecution where necessary. It also collects and publishes data on drinking water performance to support transparency and identify areas for improvement.

Wastewater and stormwater

The WSA provides system oversight for wastewater and stormwater, with a focus on improving environmental performance across networks through wastewater environmental performance standards that set requirements, limits, and conditions. Regional councils, in administering resource consents for wastewater discharges, must do so in accordance with the WSA standards. They must not require more onerous requirements than set in the standards or approve applications for discharges below the standards.

The WSA uses tools such as network performance measures, public registers of wastewater and stormwater networks, and sector guidance (including best practice information and templates) to perform this system oversight role. It also collects data from network operators and publishes reporting on network performance to support transparency and ongoing improvement. The WSA may also develop Infrastructure Design Solutions for the design and operation of wastewater and stormwater infrastructure, such as the design and operation of a modular wastewater treatment plant.

The WSA role for NEDS

As illustrated earlier, the WSA has a broader role in setting and administering standards across the water services system. Its existing work includes developing drinking water standards supported by acceptable solutions, and environmental performance standards supported by infrastructure design solutions.

The NEDS sit within this standard-setting function. The WSA is expected to oversee and administer the NEDS, alongside its existing standards and regulatory tools. Bringing the NEDS into this framework allows the WSA's standard-setting, monitoring, and compliance functions to be applied more consistently across water supply, wastewater and stormwater infrastructure.

Consolidating these responsibilities within the WSA is intended to improve the effectiveness and efficiency of the regulatory system by providing greater clarity and consistency for water service providers and supporting more efficient development and application of standards.

The water services system is underpinned by key legislation

Water services are regulated through a range of legislative instruments and regulatory tools, which operate together to set standards, monitor performance, and manage compliance across the system.

Several key pieces of legislation are listed below.

- **Water Services Authority—Taumata Arowai Act 2020**, which established the WSA as the regulator for drinking water quality and network environmental performance.
- **Water Services Act 2021**, which sets duties for drinking water suppliers and provides regulatory tools across all three waters, including the ability to create NEDS.

- **Local Government (Water Services) Act 2025**, which establishes the delivery framework under LWDW.
- **Local Government (Water Services) (Repeals and Amendments) Act 2025**, which introduced the NEDS regime to the Water Services Act and enabled economic regulation and consumer protection.

The NEDS will interact with other regulations

This section outlines how the NEDS will interact with other regulations and standards within the water services system. It highlights the key interfaces with implications for how the NEDS will operate in practice, including planning instruments, and existing sector guidance.

Drinking Water Standards

The Water Services (Drinking Water Standards for New Zealand) Regulations 2022 set limits for the concentration of determinants, specific characteristics or substances, in drinking water. These limits are maximum acceptable values (MAVs).[69] Drinking water standards set the requirements for water quality by defining what safe drinking water looks like, including limits on contaminants and other characteristics of water. Drinking water suppliers must ensure that the water they provide meets these standards.[70]

The NEDS, by contrast, focuses on the infrastructure that supports safe drinking water. It sets performance requirements for how water infrastructure is designed, constructed, operated, and maintained. This includes things like how networks function, how assets perform over time, and how they are managed.

Wastewater environmental performance standards

In December 2025, the WSA implemented New Zealand's first wastewater environmental performance standards. The legislation authorises wastewater standards that include requirements, limits, conditions or prohibitions on activities associated with wastewater networks.[71]

There are currently four standards:

- discharge to water
- discharge to land
- beneficial reuse of biosolids, and
- management of overflows and bypasses.

These standards provide for a simpler approach for gaining resource consents under the Resource Management Act for wastewater treatment plants.

Prior to the introduction of these four standards, operators of wastewater treatment plants needed to calculate the expected impact of a particular plant for the particular receiving environment through a sometimes contestable and litigious process administered by regional councils. This process was complex, costly, and led to significant variation in consent conditions across the country.[72]

The introduction of these standards aligns with the LWDW and the Government's overall approach to addressing long-standing infrastructure challenges. The WSA has identified that the opportunities and benefits of a national wastewater standard may include:

69 Explanatory note, Water Services (Drinking Water Standards for New Zealand) Regulations 2022.

70 Section 22, Water Services Act 2021.

71 Section 138, Water Services Act 2021.

72 Water Services Authority – Taumata Arowai, "Case for change", February 2025, https://www.taumataarowai.govt.nz/assets/Uploads/Wastewater-consultation/National-wastewater-standards-The-case-for-change-final.pdf?vid=3

- lower costs and faster delivery through standardised design, procurement, and consenting processes
- greater efficiency in plant design, construction, and operation
- improved planning certainty for infrastructure investment and consent renewals
- better decision-making through consistent performance benchmarking and data
- more targeted investment by improving understanding of network condition and need, and
- stronger regulatory transparency and consistency in monitoring, reporting, and compliance.[73]

Wastewater environmental performance standards and the NEDS are intended to work together, but they operate at different levels of the system. Wastewater standards set the environmental outcomes, while the NEDS focus on the infrastructure that must deliver those outcomes by setting performance requirements for how wastewater infrastructure is designed, constructed, operated, and maintained.

Infrastructure design solutions

Subpart 7A of the Water Services Act 2021 gives the WSA the legislative authority to develop infrastructure design solutions for wastewater and stormwater networks under the Water Services Act 2021.

While the IDS will **not** contain mandatory requirements, it is expected that they will contain technical performance standards, treatment processes, and design and operating requirements for some wastewater and stormwater networks.[74]

It is expected that the infrastructure design solutions (IDS) will complement environmental performance standards. The WSA states that "where wastewater infrastructure complies with an … [IDS], it is deemed to comply with the relevant environmental performance standard."[75]

Therefore, the interaction with the NEDS is important to consider. The IDS will need to be consistent with the performance requirements set by the NEDS by ensuring that recognised technical approaches align with the outcomes required under the NEDS framework. At the same time, there will need to be clear delineation between what is provided for in the IDS and what is addressed through Codes of Practice under the NEDS.

Asset Data Standards

Across New Zealand, councils currently have different methods of recording and describing their water assets. This can make it harder to share information, compare performance, and work collaboratively. It can also create costs, as organisations often need to translate information or rework data when projects span multiple areas or providers.

As the new water services delivery models are established, having consistent, reliable data becomes much more important. Organisations may need to exchange information more frequently and work across boundaries, and a common approach to data will support this transition.

The introduction of the NEDS is expected to increase expectations around how water services data is stored, shared, and reported. In this context, the Three Waters Asset Data Standard is intended to provide a common foundation for

73 "Case for change".

74 Section 139C, Water Services Act 2021.

75 Water Services Authority Taumata Arowai, "Infrastructure Design Solutions", September 2025, https://www.taumataarowai.govt.nz/wastewater-sector/infrastructure-design-solutions

managing asset data.[76] The NEDS and the Codes made under them, by adopting and being consistent with asset can support their uptake across water service providers.

Water New Zealand recommends that adopting the Three Waters Asset Data Standard early can help organisations reduce costs and risks. It allows them to align with future requirements ahead of time and avoid having to make larger, more complex changes later as the regulatory framework evolves.

Local bylaws and planning instruments

Local bylaws and planning instruments both play a role in how councils apply their engineering standards for water infrastructure. Planning instruments (such as district plans, and future plans as part of the wider planning reform – discussed below) set the rules about where development can occur and often include or trigger technical requirements for infrastructure through consent processes.

The Local Government (Water Services Act) 2025 provides for local authorities and their water service providers to develop consistent bylaws to regulate the connection and vesting of privately built water services infrastructure to council-owned networks. These bylaws are required to give effect to the NEDS and in practice will need to work together with the NEDS and Codes of Practice, which contain the detailed technical requirements for the design and build of infrastructure to be connected to public networks.

Under the current system, these tools are applied locally and can vary between councils. This means that different planning rules, bylaws, and codes of practice may apply in different areas. To address this issue, the Local Government (Water Services) Act requires all councils to review and update their water bylaws within five years to achieve consistency in bylaws across councils.

At the same time, planning system reform (discussed in the next section), is expected to introduce standardised plans and rules at a regional level. While this reform will change how planning instruments are structured, it will continue to operate alongside bylaws and technical standards, each of which plays a distinct role in regulating water infrastructure.

[76] Water New Zealand, "A National Standard for 3 Waters Asset Data", no date, https://www.waternz.org.nz/3wads

Appendix 3: Drafting detailed requirements and applying infrastructure classification

Translating common objectives into requirements

Performance domains identify the broad areas of infrastructure performance that NEDS addresses. Within each domain, NEDS sets a common objective. Those common objectives do not, by themselves, establish the specific requirements that water services infrastructure must meet.

The next phase of work by the WSA will need to translate each common objective into requirements that are clear, assessable and capable of consistent application across a sector with diverse infrastructure, varied capability and different network contexts. This section sets out a framework for this work.

This section does not propose final thresholds, metrics or evidence obligations. Those will require detailed technical work, sector testing and explicit decisions by the WSA.

The requirement chain

Performance based regulation often depends on whether the required performance can be specified, assessed and demonstrated in a reliable and consistent way. If performance standards are not designed and deployed well, they "can prove costly, ineffectual, or even counterproductive."[77] The leaky buildings experience illustrates the risk that a performance-based framework can allow theoretical compliance without reliable real-world performance where requirements, evidence and compliance pathways are not sufficiently clear.[78]

The lesson is not necessarily that NEDS should replicate the Building Code approach. However, both general literature on performance-based regulation and the Building Code analogy point to the same design principle.[79] Namely, that high-level outcomes need to be translated into specific functional requirements, assessable performance metrics or criteria, and point to clear ways of demonstrating compliance.

For NEDS, every requirement should therefore aim to be expressed through a complete chain:

Common objective → Requirement → Compliance pathway

Within each requirement:

Functional requirement → Performance requirement

This chain helps to provide structural discipline. It prevents requirements from accumulating without a clear purpose and helps ensure that compliance decisions are consistent rather than interpretive.

[77] Coglianese, C. (2016). Performance-Based Regulation: Concepts and Challenges. In F. Bignami & D. Zaring (Eds.), *Comparative Law and Regulation: Understanding the Global Regulatory Process*.

[78] May, P.J. (2003). Performance-Based Regulation and Regulatory Regimes: The Saga of Leaky Buildings. *Law and Policy*

[79] Coglianese, C., Acceptable solutions and verification methods | Building Performance, QUALITATIVE VERSUS QUANTITATIVE ASPECTS OF PERFORMANCE-BASED REGULATIONS,

A practical method for applying the requirement chain

A practical way to apply the chain is to work through two distinct questions for each requirement:

1. What specific infrastructure function is required?

This step translates the common objective into a more specific functional requirement.

The functional requirement should state what the relevant infrastructure must be capable of doing. It should be more specific than the domain but should still be expressed in performance terms rather than as a preferred design, product or method.

This step should identify:

- The primary objective the requirement supports (and secondary where applicable)
- The infrastructure, activity or lifecycle point the requirement applies to
- The function the infrastructure within scope must perform
- The conditions under which that function must be achieved.

This question should also test whether the requirement belongs in NEDS or if it is covered elsewhere. Where another regime already sets the outcome, NEDS should generally focus on the infrastructure performance pathway that supports that outcome, rather than duplicating the obligation.

2. What performance requirement demonstrates that the function has been achieved?

This is the central calibration question. It determines the specific performance bar and how it should vary by context or consequence of non-performance.

Identifying the performance requirement

The first decision is what kind and mix of performance requirements would demonstrate that the functional requirement has been met. This should make the functional requirement assessable at different lifecycle points and may take different forms, including:

- **A state-based requirement** that assesses whether infrastructure meets a defined level at a point in time
- **A design scenario requirement** that assesses whether infrastructure performs under a defined event or condition
- **A recovery requirement** that assesses whether a function is restored within a defined timeframe after disruption
- **An ongoing performance requirement** that assesses whether performance remains within defined limits over an operating period
- **A risk-based requirement** that assesses whether the likelihood of harm, failure or non-performance remains within an acceptable level

This choice should reflect how performance can realistically be demonstrated. Some factors can be measured at commissioning, and others may need to be predicted through modelling, inferred from design parameters or monitored over time. A requirement may apply to multiple lifecycle points and therefore require multiple different performance requirements depending on what can realistically be demonstrated at those lifecycle points.

Where quantification is impractical, a qualitative criterion with specified evidence may be appropriate. These would likely require more judgment and a higher assessment burden.

Deciding how the performance requirement should apply

The second decision is whether the performance requirement should be nationally fixed, based on a national method with local inputs, made proportionate through classification, or some combination of these (Table 20). This is a key choice as it centres on the balance between

national consistency, local suitability and proportionality.

This step informs what needs to be considered when setting the performance bar in the next step. For example, for a nationally fixed performance requirement, the WSA would set one national threshold or expectation. For classification-based scaling, the WSA would identify the classification categories and determine how that influences the performance bar. For a national method with local inputs, the WSA would set the national method used to determine the required level of performance and define the inputs that may affect the result.

These approaches can be combined. A resilience requirement may include a nationally fixed minimum expectation, a national method for determining local hazard inputs, and classification-based scaling of the performance level or evidence requirement.

Setting and justifying the performance bar

The third decision is the specific level of the performance bar that the performance requirement sets.

Relevant factors for determining the specific level of the performance bar include:

- The consequence of non-performance both immediately and over time
- The network role of the infrastructure
- The population, environment or service affected
- The presence of redundancy or substitute pathways
- Local physical, climatic, geological, environmental and network conditions where these genuinely affect performance
- The lifecycle stage at which the requirement applies

Table 20: How performance requirements can apply

Type	Description	Where appropriate
Nationally fixed performance requirement	The same performance requirement applies consistently across the country, with little or no local variation.	Appropriate where NEDS needs to set a clear national floor and local variation would undermine consistency, safety or confidence. This is most likely where the outcome is nationally important, the evidence base is settled, and the required level of performance does not depend materially on local physical or network conditions.
Nationally consistent method with local inputs	The performance requirement uses a national method to set the performance bar, where defined local inputs affect the result.	Appropriate where the required level of performance depends on local physical, climatic, geological, environmental or network conditions.
Classification-based scaling *(see following section in this Appendix for detail)*	NEDS sets a floor, method or decision rule, but the performance level, evidence burden or assurance pathway changes within defined classification bounds.	Appropriate where the same infrastructure function can create materially different consequences if it fails or underperforms. This is driven by what the infrastructure does and what happens if it fails. Classification allows NEDS to scale the performance level, evidence burden or assurance pathway through a defined national approach, rather than leaving proportionality to local preference, historical practice or unstructured provider-by-provider judgement.

Source: MartinJenkins analysis

- Whether failure would be immediate or slow manifesting
- The maturity of practice and strength of the evidence base
- Sector capability to apply and assess the requirement
- Cost, affordability and whole-of-life value.

Regulatory literature identifies different ways of setting performance requirements, including risk-based, feasibility-based and cost-benefit informed approaches. These should be treated as lenses for justifying the bar, rather than rigid categories. For example, a public health requirement may place greater weight on minimum protection or risk reduction.

Setting this performance bar involves balancing trade-offs. These should be considered explicitly, and may include:

- *Current practice versus aspirational performance.* Setting the bar at current good practice makes implementation faster and draws on established materials. Setting it above current practice in some areas may lift long-term performance but requires transition time and creates implementation challenges for parts of the sector. The choice should reflect whether current practice is adequate or is producing known harms that NEDS should correct.
- *National consistency versus context-specific performance.* A nationally fixed bar is simpler and more consistent. A bar that varies by local conditions is more accurate but more complex to apply. Local variation should be allowed only where it is performance-justified, where local physical or network conditions genuinely affect what infrastructure must achieve.
- *Certainty versus flexibility.* Specific thresholds are easier to assess consistently but constrain innovation and may not transfer well across different network types and sizes. More flexible requirements preserve judgement but require stronger evidence capability and more complex assessment. The appropriate balance depends on consequence, the maturity of practice, and the availability of objective evidence.
- *Higher performance versus affordability*. More demanding requirements may protect public health, environmental outcomes, resilience or service reliability more effectively, but will generally increase upfront cost. The relevant question is not whether requirements cost more, but whether the long-term value, including avoided harm, reduced renewal cost and reduced failure risk, justifies that investment. For high-consequence infrastructure, the case is strongest.

The output of this step should be a performance requirement that is clear, justified and capable of assessment. It should be clear what level of performance is required, how that level was set, whether it varies by local input or classification, and why that approach is proportionate.

Infrastructure classification

The section above established that the performance requirements can be applied to infrastructure in three ways:

1. Nationally fixed performance bar
2. Nationally consistent methods with local inputs to determine the performance bar
3. Classification-based scaling where the performance requirement, evidence requirement or compliance pathway varies by the consequence of failure of the specific infrastructure.

This section develops a potential approach to classification-based scaling.

Classification is a user-facing mechanism that groups infrastructure, so that performance requirements can scale proportionately to consequence. The detailed specification of how performance requirements scale within each class is a downstream task for detailed development. This section establishes the foundation upon which that work can be developed.

There are three key questions to resolve:

- First, the basis: what drives classification and what is being classified?
- Second, the method: how is proportionality applied?
- Third, what classification changes: what is the differential regulatory treatment that results?

These will all require judgment calls from the WSA.

Why classification may be needed

NEDS should not apply the same level of performance to every piece of infrastructure. Doing so would waste regulatory effort on low-consequence assets, impose costs that are not justified by the outcomes being protected, and potentially create a system so burdensome that it undermines the efficiency improvements the reform is designed to deliver.

At the same time, performance requirements that are calibrated only to common or low-consequence scenarios would be inadequate for critical infrastructure where failure creates serious harm. The consequence of a trunk main serving a major population failing without warning, a pump station serving a hospital losing power with no backup, or a major overflow reaching a shellfish harvesting area is fundamentally different from a minor local connection with redundancy underperforming.

Classification is a mechanism that helps to make performance requirements proportionate. It provides a nationally consistent way of identifying which infrastructure warrants which level of regulatory treatment, so that the framework can be demanding where it needs to be and efficient everywhere else.

This aligns with the WSA's regulatory approach, which is intended to be "equitable, transparent and proportionate to risk". The WSA also states that it aims to "ensure our regulatory activities and decisions are proportionate to the issues, risks and harms they address, including taking costs to suppliers and communities into account".[80]

Question 1: the basis for classification

What drives classification

The consequence of non-performance is likely the most appropriate basis for classification in NEDS because it directly connects regulatory effort to the outcomes NEDS is designed to

[80] Compliance-Monitoring-and-Enforcement-Strategy-2025-28-Water-Services-Authority-Taumata-Arowai.pdf

protect. Higher consequence of failure means greater benefit from achieving the required performance and greater risk to the outcomes NEDS cares about. That likely justifies stronger performance requirements, more demanding evidence and more structured assurance.

Consequence of non-performance is not the same as the likelihood of failure. An asset's condition and its probability of failure are relevant to asset management decisions – renewal prioritisation, maintenance scheduling, inspection timing – but they are primarily questions for water service providers under their asset management obligations. NEDS classification should not be based on likelihood because condition varies over the life of an asset, would require frequent reclassification, and would conflate a design and performance standard with an asset management assessment. Likelihood may be relevant where NEDS interfaces with lifecycle triggers such as renewal or upgrade, but it is not part of the core classification basis.

The factors that drive the consequence of non-performance, and therefore the classes, may include:

- **Duration to repair.** How long does it take to restore function if the infrastructure fails? Assets that take longer to repair create more prolonged consequences.
- **Redundancy and contingency.** Is there an alternative supply route, bypass or backup system that can maintain the function while the primary asset is out of service? Infrastructure with no redundancy creates a more serious consequence from any failure.
- **Severity of impact on service outcomes.** How significant is the effect on the service that NEDS is designed to protect –water supply, wastewater containment, stormwater management? The more fundamental the service function and the harder it is to substitute, the higher the severity.
- **Exposure – the number of people served.** Generally, the greater the population or user base directly affected by failure, the higher the consequence (accounting for redundancy and contingency considerations).
- **Sensitivity of the receiving environment.** For environmental and public health outcomes, the sensitivity of the environment or community exposed to the effects of failure – a shellfish harvesting area, a swimming beach, a hospital – affects the consequence of non-performance significantly.

What is being classified

A classification approach only works if NEDS is clear about what the consequence of non-performance rating attaches to. Consequence of non-performance should attach to the functional component – the role that the infrastructure performs in the water services system – with asset-level data providing the factual context for the classification assessment.

Question 2: the method of classification

There are a range of approaches to consider in how proportionality is embedded in NEDS performance requirements through classification. Three main approaches are considered below in, ranging from provider-led assessment to nationally prescribed triggers.

Option C is the working position. The trigger-based approach minimises the role of judgment in classification and creates a clear mechanism for proportionality. The "local inputs" under Option C are not judgment calls, rather they are factual data about the specific infrastructure. The national triggers convert those inputs into a class mechanically, with no discretion.

This is directly analogous to the Building Code's Importance Level system, where a defined building function determines the class without requiring a judgment about consequence. For

water infrastructure, the function alone does not determine consequence – a 300mm trunk main could serve 200 people in one context and 50,000 in another – so the 'triggers' refer to factual characteristics of the specific instance rather than a simple function lookup.

The class structure

Five importance classes are proposed as the working position. Five classes provide sufficient differentiation across the range of water services infrastructure to make performance requirements meaningfully proportionate. Fewer classes may reduce the granularity of the regime's proportionality; more classes would add complexity without proportionate benefit. This is a working position and should be sufficiently tested.

The proposed trigger structure for each class is set out below in Table 22. The specific thresholds are indicative and illustrative. The final thresholds should be confirmed through reference to sector data and existing criticality frameworks and tested with the sector through engagement.

Table 21: Options for the classification method

Option	Description	Strengths	Risks
Option A: National factors, provider judgment	Under this approach, NEDS defines the factors that are relevant to consequence of non-performance – duration to repair, redundancy, severity, exposure, environmental sensitivity – and requires providers to assess their infrastructure against those factors and assign a class level, which then determines the performance bar in the performance requirement. The method is drawn from existing asset management practice, which already uses multi-factor criticality assessments.	Builds on what the sector already does. Allows providers to use detailed asset-level knowledge. Flexible.	High risk of inconsistency. Without a standardised method for weighting and combining the factors, providers in different parts of the country may reach different conclusions for comparable infrastructure. Smaller providers with less capability may apply the factors inconsistently. Inconsistent classification undermines the national consistency the reform is designed to deliver.
Option B: Defined classes with a national method and local inputs	Under this approach, NEDS defines the class structure and the method for assigning a class. The method specifies how consequence factors are applied, how they are weighted or combined, and what output produces which class. Providers apply the nationally defined method to their specific infrastructure using local data – population served, redundancy status, receiving environment category – as inputs. The method is national; the data is local.	Nationally consistent method. Allows the combined profile of an asset to determine its class, meaning strong performance on multiple factors can reflect genuine lower consequence. Can align with current sector practice through asset management planning.	Even with a fully prescribed method, the composite output can depend on how factors interact. A provider may try to argue a lower class by performing well on some factors despite poor performance on others. The risk of creative interpretation remains. More complex to explain and apply than Option C.
Option C: Nationally prescribed triggers (preferred)	Under this approach, NEDS defines specific, observable triggers for each class. A functional component instance is assigned to the highest class for which any trigger is met. The triggers are based on factual characteristics of the specific infrastructure – population served, redundancy status, critical user dependence, receiving environment category – against nationally fixed thresholds. No multi-factor weighting or judgment is required; the designer or provider answers a set of factual questions and the class and associated performance bar is determined.	Maximally consistent nationally. Minimises scope for inconsistent application. Simple for users to apply. Reduces the burden on smaller providers with limited capability. Provides certainty to developers, designers and assessors about what class applies.	Nationally fixed thresholds may not reflect genuine variation in network context in all cases. Edge cases – infrastructure that is near a threshold, serves mixed populations, or has partial redundancy – require clear rules or a defined challenge process. Thresholds need careful calibration to avoid over-classifying routine infrastructure or under-classifying genuinely high-consequence assets.

Table 22: Illustrative example of the class structure

Class	Triggers
Class 5 – Very high importance Applies if any of the following triggers are met:	• Failure would affect more than [*x*] people with no effective redundancy or more than [x] people with partial redundancy. • The functional component is the sole or primary supply route to [*hospitals, emergency services, civil defence welfare centres*] • Failure would cause overflow or discharge to [a shellfish harvesting area, nationally significant ecological or cultural site] • The component is critical backbone infrastructure whose failure would disable another Class 5 component • The sole water supply to an isolated or remote community with no practicable alternative supply, regardless of population size
Class 4 – High importance Applies if any of the following triggers are met (and no Class 5 trigger applies):	• Failure would affect [*x*] people with no redundancy, or more than [*x*] with only partial redundancy • The functional component is a rising main, pressure main or trunk sewer with no bypass, where failure would result in immediate uncontrolled overflow or loss of conveyance • The functional component serves critical users but is not their sole supply • Repair or recovery following failure would exceed [*x*] days • Failure would directly affect [a swimming beach, high-sensitivity receiving waterway or other significant environmental asset] • Major stormwater conveyance or detention infrastructure whose failure would cause flooding to more than [x] properties or inundation of a critical facility.
Class 3 – Moderate importance Applies if any of the following triggers are met (and no Class 4 or 5 trigger applies):	• Failure would affect [x] people with no redundancy, or [x] with partial redundancy • Repair or recovery would take [x] days • Failure would affect [a moderately sensitive receiving environment] • Stormwater infrastructure whose failure would cause flooding to [x] properties or would disrupt a significant transport corridor
Class 2 – Low importance Applies if any of the following triggers are met (and no higher trigger applies):	• Failure would affect [x] people with partial redundancy available • Repair or recovery would take [x] days • Stormwater infrastructure whose failure would cause flooding to [x] properties
Class 1 – Very low importance Applies where no higher trigger applies:	• Failure affects fewer than [x] people with full redundancy available • Repair or recovery within [x] hours • Stormwater infrastructure serving a small catchment with limited downstream consequence

Question 3: what classification changes

Once a class is assigned, it feeds directly into the performance requirement step of the requirement chain established in the previous section. For requirements where classification is utilised, the class determines the performance requirement bar that applies. The common objective and functional requirement are the same across all classes; the specific performance requirement scales with class. Classification can change the regulatory treatment in three broad ways.

Limit the application of rules. Some NEDS requirements may only apply above a defined criticality threshold. This is directly analogous to the Building Code's approach, where some requirements apply to buildings at Importance Level 3 and above but not below.

There is also the possibility of including a top tier class that specifies particular components that are not within the scope of NEDS (e.g. wastewater treatment plants) and require more stringent and bespoke regulation.

Raise the performance bar. Higher classes may face more demanding performance requirements under the same functional requirement. This could mean a higher threshold (for example, a lower maximum overflow frequency), a more demanding design scenario (for example, a higher seismic return period), a stronger functional outcome (for example, restoring service within a shorter timeframe), or a more prescriptive form of the performance requirement itself. The performance domain and functional requirement are the same; the specific performance requirement scales with class.

Raise the assurance burden. Higher classes may require more rigorous evidence, more structured assessment or independent review. This could include more comprehensive design documentation, defined construction hold points, extended commissioning requirements, independent peer review, or more frequent and comprehensive operational monitoring.

These three treatments can be used individually or in combination or not at all. For a given requirement, it may be appropriate to limit application at the lower end (Class 1 infrastructure is exempt), raise the performance bar at Class 3 and above, and require independent review only at Class 4 and above. The right combination depends on the specific common objective and requirement.

Appendix 4: Detailed options assessment

Introduction

This section sets out the preliminary regulatory impact analysis of the proposal to implement NEDS. While not a formal Regulatory Analysis Summary (RAS), it draws on the RAS guidance and templates to provide an indication of the types of issues and analysis that is required to understand the likely impacts.

As our work so far has focused on the design of the regulatory framework, much of this analysis is necessarily high level and conceptual, informed by case studies prepared by engineering firm GHD.

The full impact of the proposal to implement NEDS will only be known through further detailed design – including decisions on the exact thresholds and requirements to set within the common objectives. These will need to be carefully analysed and costed (including associated capital expenditure impacts) over the next phase of work to provide a clear understanding of the relative costs and benefits.

We have considered the principle of responsible regulation in section 9(j)(iv) of the Regulatory Standards Act: the importance of carefully evaluating any options (including non-legislative options) that are reasonably available for addressing the issue.

Criteria for analysis

Options are analysed against six criteria as shown in the following table.[81]

[81] The RAS guidance emphasises that effectiveness, efficiency and proportionality are important considerations, in line with the principle of responsible regulation in section 9(m) of the regulatory Standards Act: "legislation should be the most effective, efficient, and proportionate response to the issue concerned that is available". Efficiency is directly considered by criteria 3, and indirectly considered by other criteria. Effectiveness is considered by criteria 4 and 5. Proportionality is considered by criteria 1 and 5 (in the phrase "significant but practicable"). Criteria are weighted equally.

Table 23: Criteria for options analysis

1 Consistency	Minimises fragmentation and drives national consistency across diverse environments and council needs to a significant but practicable degree • Do NEDS drive national consistency (thus enabling the benefits of scale to be unlocked)?
2 Clarity	Provides clarity to all parties as to the expected requirements, enabling both compliance and innovation • Are NEDS intuitive, understandable, and easy to use?
3 Cost efficiency and financial sustainability	Delivers efficiency and value-for-money by reducing duplication, shortening approval timeframes, allowing projects to progress smoothly, and lowering lifecycle costs, thus having a positive impact on affordability • Do NEDS reduce lifecycle costs? • Do NEDS allow projects to run efficiently?
4 Regulatory effectiveness	Enables proportionate and effective regulation by establishing enforceable NEDS as the foundation for compliance, monitoring and enforcement; and complements the broader regulatory environment • Do NEDS enable proportionate risk-based regulation? • Can NEDS be used by regulators?
5 Reliability and resilience	Supports the reliability and resilience of networks to a significant but practicable degree, supporting public health and safety and environmental protection • Does an option support infrastructure maintaining its integrity when exposed to shocks? • Are resilience requirements proportionate to likely risks?
6 Implementation and transition	The transition pathway for implementing a design and having it take effect is reasonable • Does the design support easy implementation? • Does the design support timely implementation? • Does an option allow NEDS to work with pre-existing infrastructure?

Scope for options analysis

The Water Services Act provides that the WSA may develop NEDS. The legislation also provides the parameters for establishing NEDS and Codes of Practice. We have limited options analysis to only options that are consistent with these legislative parameters, as described in Appendix 1.

The scope of options analysis has not been limited by any specific direction from any Minister or stakeholder engagement.

The RAS guidance encourages consideration of non-regulatory options. Pursuing a non-regulatory option would be essentially to continue the status quo. Councils are not incentivised to meet the costs of funding the work to develop national standards themselves. Central government could contribute funding but this would mean it would pay for a voluntary standard having legislated for NEDS as described in Appendix 1. We reject this as it would be non-sensical.

We have investigated if other countries take a similar approach. Research suggests New Zealand would be at the forefront of national performance-based regulation of national engineering design by developing NEDS as intended by the legislation.

The options being considered

Option 1: Status Quo / Counterfactual

Under this option, NEDS would not be established and councils would continue to rely on bespoke local codes to articulate their expectations around engineering design. The formation of joint water services organisations would result in corresponding consolidation of codes but with around 40 water services organisations expected, considerable fragmentation would persist.

Option 2: Deregulatory option (required by RAS template)

Under this option, current council codes would be removed altogether. There is no current mechanism for central government to do this. We have included it here as the RAS template requires a deregulatory option.

Assuming central government would legislate to do this, there would be no incentive under the Water Services Act for water infrastructure to be designed to a performance-based specification. Incentives to build to support performance, reliability, longevity and other public good interests would come from the threat of legal action where harm is caused, for example, under legislation that provides penalties for environmental harm.

We note the options to establish NEDS are somewhat deregulatory in that establishing NEDS would replace the approximately 45 current Codes with one set of NEDS and Codes.

Option 3: Do minimum – Establish a "targeted NEDS"

Under this option, the WSA would start by building the framework for selected areas and expand the framework over time. Objectives would be developed around those specific areas. The NEDS does not first establish a common, system-wide performance framework, at least in its initial incarnation, but may expand to this over a long period of time.

Option 4: Prioritised NEDS (Recommended)

Under this option, the WSA would establish a common and proportionate performance framework, then develop priority requirements and Code pathways first.

Common objectives would provide the overarching framework across the three waters. Their application could differ across the network,

including based on the role or importance of infrastructure.

Clear and assessable requirements and Codes are then developed first where national direction will add the greatest value and detailed development is sufficiently ready.

In sum, this option involves establishing the whole framework, then developing priority areas in the first instance.

Option 5: Comprehensive NEDS

Under this option, the WSA would establish the framework and build it out comprehensively upfront. This involves establishing the common performance framework and developing the requirements and Code pathways broadly from the outset. The NEDS would be supported by clear and accessible requirements across most areas of the performance framework, supported by Code pathways where appropriate.

Summary of options 3 – 5

Options 3 – 5 are similar in that they establish NEDS frameworks. Analysis of key design choices is in the body of the report. To recap, we summarise the key similarities and differences in the table below.

Table 24: Description of options 3 – 5

Key design choices	Option 3: Targeted NEDS	Option 4: Prioritised NEDS	Option 5: Comprehensive NEDS
Objective framework	**Component-specific objectives**: performance objectives are defined separately for specific infrastructure components or functions (for example, pipes, pump stations, treatment plants). This results in a large number of tailored objectives that reflect the characteristics of each part of the network.	**Common overarching objectives**: Use one common set of high-level performance objectives across drinking water, wastewater and stormwater. The objectives provide a coherent framework for the NEDS as a whole. The detailed requirements used to give effect to those objectives can differ across water services and infrastructure.	
Application of objectives	**Selective and proportionate application**: Apply the performance objectives and resulting requirements differently where justified by the infrastructure and its importance to network performance.		
Specification of objectives	**Clear**: the requirement is specific enough that anyone checking it, including someone proposing a different design, reaches the same answer, but it doesn't lock in one exact method.		
Initial ambition	**Targeted development**: Develop performance requirements and selected Code pathways for a small number of priority areas.	**Prioritised development**: Develop performance requirements first in priority areas, selected using an agreed prioritisation approach. Supporting Code pathways are developed where justified.	**Comprehensive development**: Develop performance requirements broadly across most potential requirement areas, with supporting Code pathways developed where justified.
Overall characterisation	**Start with selected areas and build the framework over time.**	**Establish the whole framework, then develop the priority areas first.**	**Establish the framework and build out most of it upfront.**

Note on options analysis

We stress that options are analysed based on what we know at the time of writing. Specific quantified performance measures have not been developed. These measures would enable more detailed consideration of options against some of the criteria and a much greater understanding of concepts like proportionality, and the relationship between cost/affordability and areas like resilience, reliability, and protection of health, safety, and the environment.

Drafting will also influence clarity but cannot be analysed here. Options analysis assumes the NEDS and Codes will be well-drafted.

Options analysis largely focuses on NEDS but NEDS design (for options 3 – 5) needs to be considered alongside the design of National Codes of Practice. For example, option 3 entails a "lean" NEDS which may mean more information is put into Codes to compensate for the relative brevity of the NEDS.

Table 25: Options analysis

	Option 1: Status Quo / Counterfactual	Option 2: Deregulatory option	Option 3: Do minimum – Targeted NEDS	Option 4: Prioritised NEDS (Recommended)	Option 5: Comprehensive NEDS
Consistency	**0**	- Unclear but likely to result in much more inconsistency.	+ Drives a national approach but slowly, meaning there is higher risk of inconsistency as the regulatory infrastructure is developed.	++ While the prioritised nature of the option means there is a small risk of inconsistency developing as Codes are built out over time, this option has a strong likelihood of producing consistency	++ Drives consistency.
Clarity	**0**	- Design (and therefore construction) requirements are less clear than having a dedicated code to refer to, even if the codes differ across jurisdictions.	+ Drives clarity, but with a significant risk that NEDS are either overly prescriptive (due to excessive reliance on the previous drafts developed under different policy settings) or incomplete (e.g. if only some performance-based requirements could be brought into NEDS in accordance with current policy intentions). Either would be contrary to the parameters set out in the Water Services Act, creating confusion.	++ Drives clarity, but noting the risk that inconsistencies could evolve over time if NEDS across three waters are not updated in coordinated unison.	++ Drives broad clarity once complete, noting that the scale and complexity of upfront development may make the first edition harder to produce, navigate and keep current.

	Option 1: Status Quo / Counterfactual	Option 2: Deregulatory option	Option 3: Do minimum – Targeted NEDS	Option 4: Prioritised NEDS (Recommended)	Option 5: Comprehensive NEDS
Cost efficiency and financial sustainability	**0**	**- -** Increases duplication, increases approval times, potentially increases lifecycle costs.	**+** Reduces duplication, approval delay and redesign in selected areas, but benefits are partial because local variation continues outside the targeted scope.	**++** Reduces duplication, shortens approval timeframes, allows projects to progress smoothly, and lowers lifecycle costs.	**+** Could deliver broad efficiency benefits over time, but benefits would be delayed and partly offset by a larger upfront development and implementation burden. Premature detail may also create avoidable costs.
Regulatory effectiveness	**0**	**-** Relies on ex post enforcement of penalties outside of the Water Services Act regime to incentivise behaviour consistent with public good.	**+** Assuming NEDS and codes are well designed, they will be a strong basis for regulation. However, this option prioritises getting some NEDS out, without the strategic prioritisation of option 4 that would support great regulatory effectiveness.	**++** Assuming NEDS and codes are well designed, they will be a strong basis for regulation, but with a risk of confusion developing if updates are not coordinated across waters. Prioritisation support regulatory effectiveness.	**+** Assuming NEDS and codes are well designed, they will be a strong basis for regulation. While the comprehensive nature of this option supports regulatory effectiveness, the time needed to build it before it is released means this benefit is significantly delayed which undermines the option against this criteria.
Reliability and resilience	**0**	**-** Reliability and resilience are expected to be compromised without ex ante design standards.	**+** NEDS produced under this option would support reliability and resilience, but the "targeted" nature of this option may effect when reliability and resilience benefits can be realised.	**++** NEDS uphold health, safety, and environmental protection by supporting reliability and resilience.	**+** NEDS uphold health, safety, and environmental protection by supporting reliability and resilience but the comprehensive nature of this option may delay the realisation of reliability and resilience benefits.

	Option 1: Status Quo / Counterfactual	Option 2: Deregulatory option	Option 3: Do minimum – Targeted NEDS	Option 4: Prioritised NEDS (Recommended)	Option 5: Comprehensive NEDS
Implementation and transition	**0**	+ Quick to implement in one sense but that defies the point. A deregulated system is likely to be unsatisfying and confusing for stakeholders who would want to know "what good looks like".	+ Subject to careful design. Quicker to implement than the preferred option, but only in a piecemeal fashion.	++ Subject to careful design, but balances coverage and timely benefits realisation.	+ Subject to careful design. Benefits realisation slow to materialise.
Overall assessment	**0**	- - - - -	++++++	++++++++++++	++++++++

Comments on options analysis

The analysis shows option 4 is the preferred option.

The core difference between options 3, 4, and 5 is the pace of implementation and the effort expended in developing a more rounded regulatory regime. Option 4 offers the best balance between speed of delivery while ensuring the regulatory infrastructure works well to drive consistency, clarity, and regulatory effectiveness.

It is implicit that option 3 relies most heavily on the previous work to develop NEDS where the intention was to produce a much more prescriptive document. This work could inform the regime – particularly the Codes – under any option to develop NEDS. The previous draft NEDS are not aligned to the current legislative requirements, so do not form a good basis for developing NEDS in 2026.

Appendix 5: Detailed Māori rights and interests analysis

Key points

- Māori rights around water are established through Te Tiriti/The Treaty and its principles; Treaty settlement legislation and deeds; relevant legislation including the Water Services Authority – Taumata Arowai Act 2020, local government legislation, and Marine and Coastal Area (Takutai Moana) Act 2011; and arrangements between iwi/Māori and local government.
- As a Crown entity, the WSA has both direct obligations (for example, arising from its establishing legislation, and as decision-makers under the Water Services Act with obligations under the Waikato, Waipā, Whanganui and Whangaehu settlement legislation) and obligations arising from other instruments that apply to the Crown more broadly.
- Māori have strong interests in water (beyond having rights upheld). Interests include upholding kaitiakitanga and tikanga practices; applying a holistic approach to the health of water bodies, the environment, and humans; obtaining favourable economic outcomes; and protecting marae and papakāinga. Some of these interests align with the interests of other New Zealanders.
- The NEDS and codes framework may be most relevant to Māori rights and interests through the role NEDS can play in protecting the environment and improving environmental outcomes. It is important to note, NEDS will not directly affect the location of water networks or decisions about where wastewater is discharged.
- The WSA will need to engage early and meaningfully with Māori (consistent with its operating principles provided by the Water Services Authority – Taumata Arowai Act 2020) to understand how rights and interests are affected as the proposals relating to the NEDS and COPs are developed in more detail, particularly as performance-based expectations are quantified, the trade-offs between affordability and performance domains become more tangible, and areas where the framework will support rights and interests or create other tensions become clear.

The WSA is subject to core obligations relating to Māori rights and interests

An analysis of Māori rights and interests in regard to NEDS is grounded in Māori rights and interests in relation to water more broadly.

There are core obligations that arise to the WSA directly, and others that arise to the Crown broadly, and therefore may be applicable to the WSA as a Crown entity.

Each is described in turn below.

The Water Services Authority has direct obligations to uphold Māori rights

The WSA's obligations to Māori arise from three related but distinct sources:

- Te Tiriti o Waitangi / the Treaty of Waitangi and its principles.
- Specific obligations flowing from particular Treaty settlement Acts, especially river settlements (place-based, legally binding duties).
- Obligations provided by its establishing legislation (system-wide obligations).

Each is described below.

A. Te Tiriti o Waitangi/The Treaty of Waitangi and its principles

The text of Te Tiriti/The Treaty

The starting point for Crown obligations to Māori is Te Tiriti o Waitangi/The Treaty of Waitangi. Interpretations of Te Tiriti/The Treaty vary across the English and Māori texts, and the relative weighting of the Articles.

In summary, the Crown has obligations under te Tiriti/The Treaty to respect the right of Māori to make decisions in relation to their lands and taonga (Article 2), within the context of the Crown's right to govern (Article 1). Te Tiriti/The Treaty also affirms that the Crown's obligations to New Zealand citizens are owed equally to Māori (Article 3).

Interpreting Te Tiriti/The Treaty article by article, Article 2 of the Māori text guaranteed Māori "tino rangatiratanga" over their lands, villages, and taonga. Water bodies (rivers, lakes, aquifers, geothermal resources) are widely understood as taonga. The Waitangi Tribunal has found that, in 1840, Māori exercised authority and control over water resources, including access, use, and management, grounded in tikanga. Therefore, the Crown faces a continuing obligation to recognise and respect Māori authority, rights, and interests in water. These rights extend beyond narrow property concepts – covering governance, use, and responsibility (kaitiakitanga).

Article 1 grants governance authority (kāwanatanga) to the Crown. This means the Crown may regulate water, but must do so consistently with Article 2 guarantees. The tension between rangatiratanga (Māori self-determination) and kāwanatanga (the Crown's right to govern and make laws) is difficult to resolve in 2026. The Treaty principles (see below) attempt to bridge this divide.

Article 3 guarantees Māori the rights and privileges of British subjects. This means the Crown must ensure equitable outcomes, including access to and benefits from water resources.

The Treaty principles

As the English and Māori texts differ and are not directly enforceable, courts and the Waitangi Tribunal have articulated Treaty principles that govern Crown conduct.

Partnership

The Treaty establishes a relationship akin to partnership, requiring good faith and reasonableness. This means the Crown, including the WSA, must:

- engage meaningfully with iwi and hapū in freshwater policy and allocation decisions, and
- co-design governance and management arrangements where appropriate (e.g., co-governance or joint management).

Courts have emphasised that consultation flows from partnership obligations.

Active protection

The Crown has a positive duty to actively protect Māori rights and interests, including taonga. In regard to water, this obliges the Crown to protect:

- Māori proprietary rights and interests in water resources
- Cultural and spiritual relationships with water
- The health and mauri of water bodies (consistent with concepts like Te Mana o te Wai).

Importantly, the duty is proactive, not merely reactive.

Participation

Māori must be able to participate in decision-making affecting their taonga. In regard to water, this includes:

- involvement in planning, consenting, and policy processes, and
- recognition of iwi/hapū planning documents.

This principle is reflected in statutory frameworks like the resource management system, which require consideration of Māori relationships with ancestral waters and kaitiakitanga.

The Waitangi Tribunal has ruled on Māori rights to freshwater

Freshwater extends beyond the responsibilities of the WSA, with the main intersection being the extent to which discharges might impact a freshwater body.

This section is largely reproduced from the Environment Guide.[82] See: https://www.environmentguide.org.nz/issues/freshwater/freshwater-management-framework/ownership-of-freshwater/

Under British common law, naturally flowing freshwater is not owned by anyone, but is treated as a public good. This is still the legal position in New Zealand today.

The Ngāti Apa case

There is an unresolved issue as to Māori rights to freshwater. The Court of Appeal in the *Ngati Apa* case found that the introduction of common law to New Zealand from England did not extinguish Māori customary title. This means that whatever customary title Māori held to freshwater, prior to the assertion of British Sovereignty in 1840, will continue to exist unless it has been lawfully extinguished. Some nineteenth century deeds of sale of Māori lands explicitly transferred the rights to use water associated with the land but others did not.

Wai 2358, Stage 1

In 2012 the Waitangi Tribunal released its Stage 1 Report on the National Freshwater and Geothermal Resources Claim (Wai 2358). This related specifically to the Crown's policy to privatise up to 49% of four State-owned Enterprises Mighty River Power, Meridian, Genesis, and Solid Energy, without first protecting and providing for Māori rights in the water resources used by these companies which

[82] The content and views expressed in this Guide are those of the Environment Foundation and the Environmental Defence Society. The Ministry for the Environment provided funding for the updating of this Guide.

were guaranteed and protect by Te Tiriti o Waitangi.

The Tribunal found that Māori rights in the water resources at 1840 included authority and control over access to water and over its use. This authority was sourced in tikanga and carried with it kaitiaki obligations to care for and protect the resource. Sometimes authority and use was shared between hapū but it was always exclusive to specific kin groups; access and use for outsiders required permission. This authority and control extended to all elements of a water body; its constituent elements (water, banks, fish etc) were not severable, because of the way in which the waterbody was used and valued. The Tribunal found that full-blown ownership of property in the English sense was the closest legal equivalent for Māori customary rights in 1840 and that such rights were protected by Te Tiriti, although tino rangatiratanga was explained by the Tribunal to in fact be more than ownership as it also encompassed the authority of hapū to arrange and manage their own affairs in partnership with the Crown.

Against that background the Tribunal reached the view that the Crown had not been sufficiently informed in its decision to privatise the abovementioned State-owned Enterprises so as to conduct a fair and Treaty-compliant balancing of interests.

Following on from the Tribunal's Stage 1 Report, in 2013 the New Zealand Māori Council applied for declarations that the proposed partial sale of Mighty River Power Ltd was unlawful on the grounds it would be inconsistent with the principles of the Treaty of Waitangi. This rested on potential future Waitangi Tribunal claims in relation to Crown failures to protect Māori in their *full and exclusive and undisturbed possession* or *tino rangatiratanga* of their water properties or taonga, as guaranteed by the Treaty. The appeal was unsuccessful in the High Court and was then heard by the Supreme Court.

The Supreme Court noted that the Waitangi Tribunal has held in a number of decisions that claims of Treaty breach in relation to waters are well-founded and that Māori rights in relation to waters of significance are in the nature of ownership. In its interim report on the *National Freshwater and Geothermal Claim* the Waitangi Tribunal found that *the proprietary right guaranteed to hapu and iwi by the Treaty in 1840 was the exclusive right to control access to and use of the water while it was in their rohe.* The Tribunal recognised that the customary authority exercised in 1840 must be adapted to meet modern circumstances and the need for resources to be shared with all New Zealanders. Despite recognising that Treaty claims in relation to freshwater may be successful, the Supreme Court found that the partial sale of Mighty River Power Ltd would not materially impair the Crown's ability to provide redress for any successful Treaty claims. This was in part due to the guarantees offered by then Deputy Prime Minister Bill English to the High Court, among them that "The recognition of rights and interests in freshwater and geothermal resources must, by definition, involve mechanisms that relate to the ongoing use of those resources, and may include decision-making roles in relation to care, protection, use, access and allocation, and/or charges or rentals for use."

Wai 2358, Stage 2

The Tribunal released the pre-publication version of its Stage 2 Report on the National Freshwater and Geothermal Resources Claims in 2019.

Stage 2 of these claims asked the Tribunal to consider whether the present law in respect of freshwater (largely the RMA) is consistent with the principles of Te Tiriti o Waitangi, and whether proposed reforms (under the National -led Government between 2009-2017) adequately provided for rights and interests in freshwater.

The Tribunal concluded that the RMA was in breach of Te Tiriti because the Crown had refused to recognise Māori propriety rights during the development of the Act. As a result, a number of the features of the RMA relating to freshwater (e.g. direction applying to section 8 RMA, weak direction around transfer of powers

to iwi and iwi management plans, first in first served system, failure to protect or improve freshwater health), are in breach of Te Tiriti. On reviewing the reform proposals, the Tribunal concluded that the results of the 'Next Steps' freshwater reform process were also not Te Tiriti compliant. A key reason for this was the view that the Crown did not make decisions in partnership but reserved decision-making for itself. The Tribunal did however acknowledge that the process of co-design with the iwi leaders group between 2014 – 2017 was innovative and should be the norm going forward.

The Tribunal made a number of recommendations for reform of the RMA and the freshwater management system more broadly, in particular relating to co-governance and co-management.

B. Treaty settlements

The Authority has explicit obligations within specific river catchments that arise from Treaty settlement Acts, in particular:

- Waikato–Waipā River settlements
- Whanganui River settlement (Te Awa Tupua)
- Whangaehu River settlement (Te Mana Tupua and Ngā Toka Tupua).

Waikato–Waipā River settlements

These settlements:

- establish co-governance and co-management arrangements between iwi and the Crown
- recognise iwi mana whakahaere (authority) over the river, and
- require public authorities to give effect to Te Ture Whaimana (Vision and Strategy) for the river.

The Authority must ensure its regulatory decisions (e.g. wastewater standards, compliance monitoring) are consistent with restoration objectives and iwi partnership frameworks in the catchment.

The Waikato–Tainui Raupatu Claims (Waikato River) Settlement Act 2010 includes several sections that note Te Ture Whaimana prevails over inconsistent provisions in other documents including a wastewater environmental performance standard, stormwater performance standard, or infrastructure design solution made under the Water Services Act (section 12).

Further, a person carrying out functions or exercising powers relating to the Waikato River or its catchment under the Local Government (Water Services) Act 2025, Water Services Authority—Taumata Arowai Act 2020, or the Water Services Act 2021 must have particular regard to Te Ture Whaimana (section 17).

These provisions are carried through to the Nga Wai o Maniapoto (Waipa River) Act 2012 and Ngāti Tūwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010.

Whanganui River settlement (Te Awa Tupua)

This settlement:

- recognises the river as a legal person (Te Awa Tupua)
- establishes Tupua te Kawa (intrinsic values of the river), and
- requires public authorities to align decision-making with those values.

The Authority's regulatory frameworks (e.g. wastewater discharges) must be consistent with the river's legal status and values, and coordinated with governance bodies such as Te Pou Tupua.

Under Te Awa Tupua (Whanganui River Claims Settlement) Act 2017, persons exercising or performing a function, power, or duty under the Water Services Act 2021 and the Water Services Authority—Taumata Arowai Act 2020 must recognise and provide for the Te Awa Tupua status (the legal and conceptual status of the Whanganui River under the Te Awa Tupua

(Whanganui River Claims Settlement) Act 2017), and Tupua te Kawa (the natural law and value system of the Whanganui River, expressed through a set of core principles that guide all decisions affecting the river).

Persons exercising or performing functions, powers, or duties under the Acts listed in the previous paragraph must also have particular regard to Te Heke Ngahuru (the long-term, whole-of-river strategy for Te Awa Tupua, setting the direction for how the river and its catchment are managed and restored).

Whangaehu (Ngāti Rangi)

The Ngāti Rangi settlement:

- recognises the river as a legal person (Ngā Mana Tupua)
- establishes Ngā Toka Tupua (intrinsic values of the river), and
- requires public authorities to align decision-making with those values.

The Authority's regulatory frameworks (e.g. wastewater discharges) must be consistent with the river's legal status and values, and coordinated with governance bodies such as Ngā Wai Tōtā.

Under the Ngāti Rangi Claims Settlement Act 2019, persons exercising or performing a function, power, or duty under the Water Services Act 2021 and the Water Services Authority—Taumata Arowai Act 2020 must recognise and provide for the Ngā Mana Tupua status (the legal and conceptual status of the Whangaehu River and Ngā Toka Tupua (the natural law and value system of the Whangaehu River, expressed through a set of core principles that guide all decisions affecting the river).

Persons exercising or performing functions, powers, or duties under the Acts listed in the previous paragraph must also have particular regard to Te Tāhoratanga (the long-term, whole-of-river strategy for Ngā Mana Tupua, setting the direction for how the river and its catchment are managed and restored).

Where a settlement binds the Crown, it binds the WSA

There are also Treaty settlements that bind the Crown, and thus bind the WSA as a Crown entity, to the degree that its work relates to the provisions of the settlements. For example, Treaty settlements may have co-management arrangements over natural resources.

C. The provisions of the Water Services Authority—Taumata Arowai Act 2020

The legislation that established the WSA provides for the ways it must operate to consider and provide for Māori interests.

Māori interests in section 5

Section 5 lists the provisions in the Act that recognise and respect the Crown's responsibility to consider and provide for Māori interests, namely:

- section 14 establishes the Māori Advisory Group
- section 17(1) and (2) provides that the role of the Māori Advisory Group is to advise the board and the Water Services Authority on Māori interests and knowledge, from a Māori perspective and in accordance with the group's terms of reference
- section 17(3) requires the board to take the advice of the Māori Advisory Group into account
- section 18 provides the operating principles of the Water Services Authority (see below)
- section 19 requires the board to maintain systems and processes to ensure that, for the purposes of carrying out its functions

under this Act, the Water Services Authority has the capability and capacity:

- to uphold the Treaty of Waitangi (Te Tiriti o Waitangi) and its principles; and
- to engage with Māori and to understand perspectives of Māori.

Operating principles in section 18

Section 18 of the Water Services Authority—Taumata Arowai Act 2020 provides operating principles. The Authority must ensure that its performance and delivery of its objectives, functions, and duties are guided and informed by the operating principles.

In relation to Māori, the operating principles for the WSA are:

- *building and maintaining credibility and integrity, so that the WSA is trusted by…Māori*
- *partnering and engaging early and meaningfully with Māori, including to inform how the Water Services Authority can—*
  - *take into account—*
    - any relevant national directions made under Part 5 of the Resource Management Act 1991; and
    - any regional plans prepared under the Resource Management Act 1991 that relate to freshwater:
  - *understand, support, and enable the exercise of mātauranga Māori, tikanga Māori, and kaitiakitanga.*

Other legislation relating to Māori rights

The Marine and Coastal Area (Takutai Moana) Act 2011

The WSA has no direct role under this Act. As for freshwater, with the main intersection is likely to be the extent to which discharges might impact the foreshore and seabed. It is summarised here for completeness.

The purpose of this Act is to:

- *establish a durable scheme to ensure the protection of the legitimate interests of all New Zealanders in the marine and coastal area of New Zealand; and*
- *recognise the mana tuku iho exercised in the marine and coastal area by iwi, hapū, and whānau as tangata whenua; and*
- *provide for the exercise of customary interests in the common marine and coastal area; and*
- *acknowledge the Treaty of Waitangi (te Tiriti o Waitangi).*

A central feature of the Act is the recognition and protection of Māori customary interests within the common marine and coastal area. It provides two primary forms of legal recognition: protected customary rights (which safeguard specific traditional activities and uses) and customary marine title (which recognises an iwi, hapū or whānau relationship with a defined area, based on tikanga and exclusive use since at least 1840). These rights do not amount to full ownership and cannot restrict general public access or activities such as fishing and navigation, but they can confer certain participatory and consent rights in relation to resource management decisions. Recognition can be obtained through the High Court or by negotiated agreement with the Crown, restoring opportunities for Māori to have customary interests legally recognised following their extinguishment under earlier legislation.

Māori relationships with local government (including the resource management system)

Local government is required to provide space for Māori perspectives and relationships with water and taonga. For example:

- The Planning Bill provides for Māori rights and interests through:
  - Māori participation in the development of national instruments, spatial planning, and land use plans
  - the identification and protection of sites of significance to Māori (including, wāhi tapu, water bodies, or sites in or on the coastal marine area)
  - enabling the development and protection of identified Māori land, and
  - carrying through existing or initiated Mana Whakahono ā Rohe - a specific statutory mechanism under the Resource Management Act 1991 (RMA) that formalises how tangata whenua and local authorities work together.
- Under the NPS-FM, councils must:
  - Give effect to Te Mana o te Wai
  - Work with tangata whenua and communities to set long-term freshwater visions
- The Local Government Act 2002 and Local Government (Water Services) Act 2025 require councils and water services providers to provide opportunities for Māori to contribute to decision-making, particularly in relation to significant bodies of water.

In practice, this means councils engage and consult Māori on key issues. There are a broad range of agreements and arrangements in place that set requirements in relation to management of water and relevant public infrastructure.

Formal partnership agreements have been established in some parts of the country. For example, Greater Wellington regional Council has a Memorandum of Partnership with local iwi. Councils can establish advisory or co-governance arrangements with tangata whenua. Cooperative arrangements can span all parts of the process, from planning to governance to operations.

Māori have strong interests in water

Māori have strong interests in water, beyond a strong interest in having rights upheld.

Upholding kaitiakitanga and tikanga practices

As set out above, the WSA is not a quality regulator of discharges to water. Regulation of water quality is primarily undertaken by regional councils, the Ministry for the Environment, and the Department of Conservation. However, discharges can impact on water and the WSA is required under its operating principles to engage early and meaningfully with Māori to understand their interests – such as the exercise of kaitiakitanga and tikanga.

Kaitiakitanga is commonly translated as guardianship or stewardship, but it has a broader, culturally grounded meaning. It refers to the obligation of tangata whenua to care for, protect, and sustain the natural environment, including water, in accordance with tikanga Māori and intergenerational responsibility.

Key concepts underpinning kaitiakitanga include:

- Mauri – the life force of water, which must be protected
- Mana and tapu – the authority and sacredness associated with natural resources
- Tikanga – customary practices guiding responsible use

- Intergenerational stewardship – ensuring sustainability over time

Kaitiakitanga is therefore not simply environmental management; it is a cultural, spiritual, and ethical duty to actively protect and enhance water and its ecosystems.

Māori aspirations for kaitiakitanga in freshwater management are expressed through a combination of environmental outcomes, governance roles, and tikanga-based practices. These are explained below.

Protecting the health and mauri of water

Protecting the health and mauri (life force) of water involves:

- maintaining or restoring the mauri and ecological integrity of rivers, lakes, and aquifers
- seeking high water quality standards, including water that is safe for drinking, bathing, and sustaining mahinga kai, and
- preventing degradation (e.g. pollution, over-allocation), and restoring degraded waterways.

This aligns with Te Mana o te Wai (see below), which prioritises the health of water bodies first, recognising that environmental health underpins human wellbeing.

Exercising kaitiaki roles in governance and decision-making

Giving effect to kaitiakitanga in governance and decision-making entails:

- ensuring tangata whenua have a meaningful role in decision-making over water (for example, in planning, allocation, and monitoring)
- embedding mātauranga Māori and local knowledge in freshwater management, and
- providing for Māori participation in co-governance, advisory groups, and statutory processes.

Kaitiakitanga requires the ability to act as kaitiaki, meaning opportunities to influence decisions that affect water.

Applying tikanga-based management practices

Tikanga refers to the Māori system of values, customs, and protocols that guide the right way of doing things and how people should behave. Tikanga water management practices regulate human interaction with water to ensure long-term sustainability and balance.

Traditional and contemporary practices used to uphold kaitiakitanga in regard to water include:

- rāhui (temporary restrictions) to allow ecosystems to recover
- sustainable harvesting practices, including taking only what is needed
- use of tools such as the maramataka (lunar calendar) to guide resource use, and
- protection of wāhi tapu and culturally significant sites.

Active restoration and protection of waterways

Where degradation has occurred, kaitiakitanga would entail actively restoring a water body to a healthy state. This could entail:

- iwi and hapū-led restoration projects (like native planting, habitat restoration)
- monitoring of waterway health and species populations, and
- reducing pollution and improving catchment management.

Enabling cultural use and connection to water

Enabling cultural use and connection to water involves:

- ensuring waterways support mahinga kai (food gathering) and customary use

- protecting water quality to support cultural practices, identity, and wellbeing, and
- recognising water as a taonga with cultural and spiritual significance.

For many iwi, the ability to exercise kaitiakitanga is directly linked to maintaining living relationships with ancestral waters.

Te Mana o Te Wai and a holistic understanding of the environment

At its core, kaitiakitanga reflects a holistic worldview in which people are not separate from nature but are part of an interconnected system linked through whakapapa. The health of water bodies (wai) is therefore inseparable from the health of ecosystems, communities, and future generations.

Te Mana o Te Wai capture this idea and is the "fundamental concept" in the National Policy Statement for Freshwater Management (NPS-FM). It requires that freshwater management restores and preserves balance between water, ecosystems, and communities.

A key feature is its hierarchy of obligations:

- First: the health and well-being of water bodies and freshwater ecosystems
- Second: the health needs of people (for example, drinking water)
- Third: the ability of people and communities to provide for social, economic, and cultural well-being.

As the fundamental concept in the NPS-FM, Te Mana o Te Wai:

- applies to all freshwater management across councils and decision-makers
- guides policy development, planning, and decision-making, including objectives, limits, and consenting
- obliges decision-makers to prioritise the health of water bodies and give effect to its principles in practice, and
- reinforces the role of tangata whenua in freshwater governance, including recognising their authority, knowledge, and responsibilities in relation to wai.

The NPS FM identifies six interrelated principles that give effect to Te Mana o Te Wai:

- **Mana whakahaere**: the power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater
- **Kaitiakitanga**: the obligations of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations
- **Manaakitanga**: the process by which tangata whenua show respect, generosity, and care for freshwater and for others
- **Governance**: the responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future
- **Stewardship**: the obligations of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations
- **Care and respect**: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.

The importance of economic outcomes

Economic outcomes from water services charging are important for Māori because they directly affect equity of access, ability to realise rights and interests in water, and broader economic development opportunities connected to wai.

Affordability and equitable access to essential services

Water services are essential services, and charging regimes determine whether households and communities can access them sustainably. Māori communities, including whānau, marae and papakāinga, can be disproportionately affected by affordability constraints, making fair and efficient pricing critical to equity outcomes. Water services reform explicitly recognises the need to address long-term affordability challenges and equity of access, including for iwi and Māori.

The final design of NEDS and codes needs to balance infrastructure design with practical affordability considerations. A well-designed NEDS framework will support equitable access consistent with Te Tiriti obligations.

Enabling Māori economic development and use of water

Māori have recognised economic and development interests in freshwater, including use of water to support land utilisation, enterprise, and community development. Charging frameworks influence the cost of accessing water services infrastructure and the feasibility of Māori land development and businesses. This means it is important that pricing arrangements are predictable, transparent, and proportionate to enable Māori to realise economic opportunities linked to land and water resources.

Supporting intergenerational prosperity

In te ao Māori, economic outcomes are not limited to financial returns but include intergenerational wellbeing and stewardship of taonga such as water – essentially financial kaitiakitangi to support kaitiakitangi of people and the environment. Sustainable investment in water infrastructure, funded through charges, supports long-term community resilience and prosperity, as well as delivery of reliable and safe water services, protection of mahinga kai and customary uses.

In other words, economic outcomes and water charges are closely related to maintaining both environmental health and economic wellbeing across generations.

Participation in the water services economy

Māori work in providing water services, for example, as engineers, designers, or contractors. Water services charging underpins investment, infrastructure upgrades, and workforce development, which create economic opportunities. Māori therefore have a direct interest in economic opportunities from NEDS requirements, and the skills needed to deliver NEDS.

Aligning with Te Mana o te Wai and Treaty considerations

Te Mana o te Wai requires that water management supports both environmental health and community wellbeing, including Māori rights and interests. Charging frameworks must therefore balance the financial sustainability of services, affordability and fairness, and recognition of tangata whenua interests and kaitiakitanga roles. The key point is that economic outcomes from charging are not neutral—they are part of how the system gives effect to Te Tiriti/The Treaty and Te Mana o te Wai.

Marae and papakāinga

Marae and papakāinga must be protected from water services risks by ensuring safe drinking water supply, effective wastewater treatment and disposal, and resilient stormwater management. This involves preventing contamination, overflows, and flooding through appropriate infrastructure design, operation, maintenance, and regulatory compliance. Particular attention is required to address historic underinvestment and ensure that water services systems are reliable, fit-for-purpose, and capable

of protecting the health of communities and the mauri of the surrounding taiao.

New marae and papakāinga need to connect to water services networks. As future work on water services networks will be undertaken in accordance with NEDS, Māori will have an interest in NEDS as building owners. Māori will also have an interest in the NEDS regime for water infrastructure interacting smoothly with the Building Code regime for buildings.

Many Māori interests align with the interests of other New Zealanders

Generally, New Zealanders care about protecting and restoring the environment and the costs involved in service provision. In this sense, many Māori interests align with the interests of most New Zealanders.

Māori rights and interests relate to NEDS

NEDS cannot address all Māori interests in water

It is important to note that the NEDS framework cannot address all Māori interests in water. For example, NEDS will not directly address where networks are located, where water is sourced, how wastewater or stormwater is treated, or whether wastewater is discharged to land or water. Other parts of the regulatory system deal with these matters.

Nonetheless, we expect NEDS to support some Māori interests

NEDS and codes provide a nationally consistent, technical baseline for designing (and therefore building) water infrastructure. We expect this to support some Māori interests.

We expect NEDS to result in better infrastructure. The NEDS regime will replace outdated, bespoke council codes. It will provide a framework to ensure New Zealand's infrastructure is designed appropriately to withstand natural hazards exacerbated by climate change. This should:

- Support better public health, safety, and environmental outcomes. We expect fewer leaks; reduced risk of contamination, service failures, and environmental harm; and improved drinking water safety. This is consistent with kaitiakitanga aspirations and protecting the natural environment.
- Reduce some costs, resulting in lower water charges for consumers. We expect NEDS to lower infrastructure lifecycle costs, as well as the costs involved in designing infrastructure, procuring physical material to build, and running administrative or regulatory processes like vesting infrastructure in public networks. We also expect clear standards to improve productivity and capability, as designs and approaches will be scalable and replicable across the country. This should further support cost reduction. This is consistent with Māori (and general) interests in having more affordable essential services (balanced with other considerations like the cost of environmental protection).
- Improve the reliability and resilience of networks, thus supporting higher service levels and protecting health, safety and the environment.
- Improve regulatory effectiveness. This supports the realisation of the other benefits.

NEDS also provide a basis for continuous improvement over time. The regular reviews provided by legislation mean the NEDS framework can be updated to address new issues and take account of evolving international and domestic best practice approaches. This means the benefits expected above should increase over time.

As set out elsewhere in this paper, NEDS could be particularly helpful to smaller councils with fewer resources who have failed to update their

bespoke codes. Some historically and predominantly Māori settlements fall within the districts of these councils.

National consistency and local interests

Māori rights and interests are exercised at sub-national level in many contexts, for example, by iwi, hapū, or whānau. These groups have a recognised rohe, the defined geographic area (including land, water, and resources) over which a group has a connection, interests, and responsibilities. The rohe anchors mana whenua and kaitiakitanga.

The NEDS framework is underpinned by an intention to create a nationally consistent framework. On paper, if not in practice, this may conflict with the local influence sought by mana whenua. There may be aspects of NEDS design and implementation where mana whenua hold a view over the approach that should be taken within their rohe that is contrary to the position in the NEDS and codes framework. Consultation is necessary to surface these issues. We provide further comments on this below.

Māori rights and interests have implications for the WSA beyond this MartinJenkins engagement

MartinJenkins and GHD have been engaged to propose a design for the NEDS framework. We aim to avoid inconsistency with Māori rights and interests in fulfilling this task.

Māori rights and interests will be more explicitly relevant in future stages of work to further develop the NEDS and codes framework. For example:

- The Authority needs to ensure it consults appropriately with Māori on NEDS design proposals. Māori have a preference for early and ongoing engagement and there is an opportunity for the WSA to do that in regard to NEDS.
- Further work to quantify performance-based expectations to be codified in the NEDS and codes will be where trade offs are really surfaced between various interests like resilience and affordability. For example, infrastructure may be incredibly resilient at an unaffordable price, so a balance needs to be struck. Māori groups may have strong views on the best balance between performance domains and likely cost impacts. These trade-offs are best surfaced and discussed when actual quantified performance measures are proposed to inform the discussion.

Appendix 6: Case studies

[Attached as a separate document]

Appendix 7: Domestic comparators

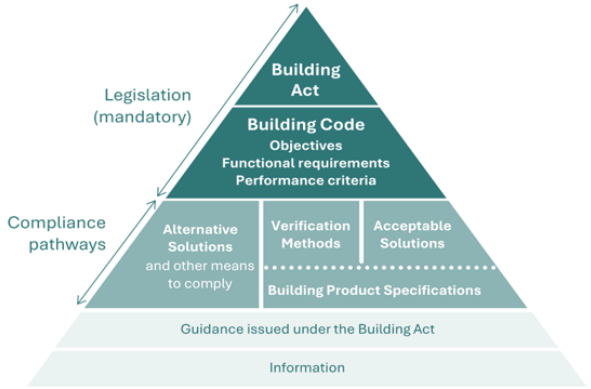
Building regime overview: what matters for NEDS

The building regime is a useful comparator for NEDS because it has already tested the same basic regulatory architecture: a national performance-based standard, recognised deemed-to-comply pathways, alternative solutions, local approval decisions, and central stewardship.

Regime architecture

The building regime operates through a layered architecture:

1. **Building Act 2004**
   Sets the statutory purpose, roles, duties, approval powers and accountability settings.
2. **Building Code**
   National performance requirements: objectives, functional requirements and performance criteria.
3. **Acceptable Solutions and Verification Methods**
   Deemed-to-comply pathways: standard recipes and evidential methods that approval bodies must accept when used within scope.
4. **Alternative solutions and assurance**
   Case-specific demonstration of compliance, supported by BCA assessment, inspections, completion certification and targeted in-use obligations.



How the regime has evolved

Pre-1991 problem	Fragmented, locally variable and prescriptive controls created inconsistency, cost and limited innovation.
1991 response	Single national performance-based code, with recognised pathways and alternative solutions.
2004 reset	Leaky homes showed the model needs clear evidence, capable practitioners, stronger accountability and active stewardship.
Later refinements	Assurance has shifted toward proportionality: more effort where risk, complexity or consequence is higher.

Implications for NEDS

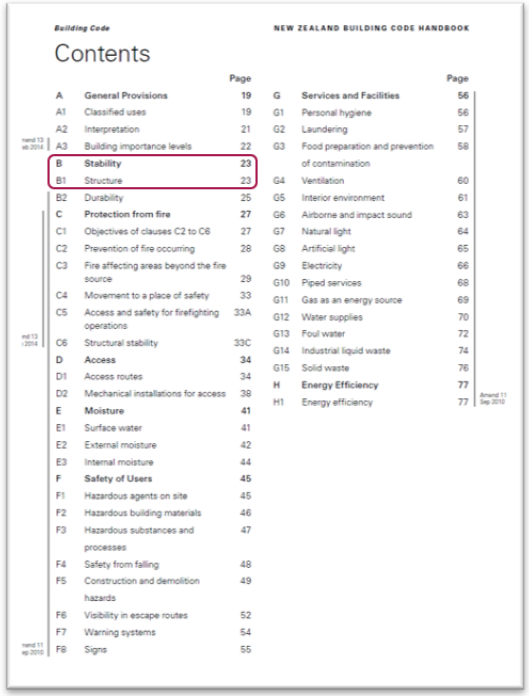
A core question for NEDS: How should NEDS allocate certainty, flexibility, evidence and assurance across its layers, so performance requirements are clear, usable and proportionate in practice?

NEDS layer	CoP layer	Evidence	Risk & proportionality
Which outcomes must be nationally consistent, and how specific must they be to be assessable?	*Which areas need a deemed-to-comply pathway, and where should judgement remain?*	*What evidence is needed to demonstrate compliance, and at which lifecycle points?*	*Where should requirements, evidence or assurance vary by consequence, complexity or detectability of failure?*

Building regime: performance requirement example

The Building Code provisions

The example shown on this slide is clause B1: Structure, which comes under Stability in the Building Code.



Building Code NEW ZEALAND BUILDING CODE HANDBOOK

Contents

Clause B1 - Structure

OBJECTIVE

B1.1 The objective of this provision is to:

(a) Safeguard people from injury caused by structural failure,

(b) Safeguard people from loss of amenity caused by structural behaviour, and

(c) Protect other property from physical damage caused by structural failure.

FUNCTIONAL REQUIREMENT

B1.2 Buildings, building elements and sitework shall withstand the combination of loads that they are likely to experience during construction or alteration and throughout their lives.

PERFORMANCE

B1.3.1 Buildings, building elements and sitework shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives.

B1.3.2 Buildings, building elements and sitework shall have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives, or during construction or alteration when the building is in use.

B1.3.3 Account shall be taken of all physical conditions likely to affect the stability of buildings, building elements and sitework, including: *[a-r sets out the conditions including self-weight, earthquake, earth pressure and wind]*

B1.3.4 Due allowance shall be made for:

(a) The consequences of failure, (b) The intended use of the building, (c) Effects of uncertainties resulting from construction activities, or the sequence in which construction activities occur, (d) Variation in the properties of materials and the characteristics of the site, and (e) Accuracy limitations inherent in the methods used to predict the stability of buildings.

B1.3.5 The demolition of buildings shall be carried out in a way that avoids the likelihood of premature collapse.

B1.3.6 Sitework, where necessary, shall be carried out to: (a) Provide stability for construction on the site, and (b) Avoid the likelihood of damage to other property.

B1.3.7 Any sitework and associated supports shall take account of the effects of: (a) Changes in ground water level, (b) Water, weather and vegetation, and (c) Ground loss and slumping.

Acceptable Solution B1/AS1

1.1.1 Scope of this document

1.1.1.1 This acceptable solution can be used to determine the structural provisions for buildings along with other specific building elements(...)

1.2 USING THIS ACCEPTABLE SOLUTION

1.2.1 Determining when good ground has been established

1.2.1.1 Good ground includes any soil or rock capable of permanently withstanding an ultimate bearing pressure of 300 kPa (i.e. an allowable bearing pressure of 100 kPa using a factor of safety of 3.0), but excludes(...)

PART 2. BUILDINGS AND STRUCTURES

2.1. MASONRY

2.1.1 Reinforced concrete masonry

2.1.1.1 Reinforced concrete masonry shall comply with NZS 4229 subject to:

a) the modifications in Subsection 2.1.2 and Subsection 2.1.3; and

b) the additional requirement for welded steel mesh in Subsection 2.1.4.

2.1.2 Referenced documents

2.1.2.1 In NZS 4229, replace reference to AS/NZS 4671:2001 with AS/NZS 4671:2019 (...)

2.2. STEEL

2.2.1 Light steel frame

Light steel frame buildings shall comply with NASH Standard Part 2 Light Steel framed buildings.

2.3 TIMBER (...)

Link to Building Code

Link to B1 - Structure

Link to B1/AS1

Other domestic comparators: what matters for NEDS

These regimes are useful because each tests a different part of the NEDS design problem. HSWA tests how judgement and proportionality are structured in a performance-based regime. The wastewater standards test how national consistency can accommodate local environmental context. The drinking water regime tests how outcome standards, operational rules and proportionate pathways work together in a water-sector setting.

1 The Health & Safety at Work Regime

HSWA centres on a broad duty to manage risk so far as is "reasonably practicable", supported by a structured set of factors that must be weighed in decision-making: likelihood of harm, severity of harm, what is known or ought to be known, availability and suitability of controls, and cost relative to risk. It relies on a mix of guidance, recognised pathways (ACoPs) and graduated regulatory intervention to support and test compliance.

Relevance to NEDS

The regime demonstrates how judgement can be structured in a performance-based framework. Rather than leaving decision-makers to interpret outcomes from first principles, it defines the factors that inform decisions, the roles responsible for those decisions, and the expectation that evidence supports them.

Design questions for NEDS

- What factors must be weighed when determining the required level of prescription, evidence or assurance? (e.g. consequence of failure, asset criticality, environmental or public health risk, detectability, complexity, cost)
- What evidence must support judgement calls? Particularly where compliance relies on modelling, professional judgement or an alternative solution.
- Where should different types of content sit in the regime? What belongs in NEDS, in deemed-to-comply CoPs, in verification/evidence requirements, or in guidance?

2 Wastewater Environmental Performance Standards

The Wastewater Environmental Performance Standards set nationally consistent requirements for wastewater discharges covering biosolids to land, overflows and bypasses, discharges into water, and discharges to land.

The standards use defined categories and evidence requirements, including receiving environment classifications, risk assessment of overflow points, monitoring, record-keeping and reporting.

Relevance to NEDS

The standards show how a national regime can reflect local context without relying on unconstrained local discretion. Variation is built into the national framework through defined categories, inputs and evidence requirements. Another key lesson is that performance should be made observable through proportionate data, monitoring and reporting.

Design questions for NEDS

- What data, monitoring, commissioning or handover evidence is needed to make performance observable?
- How should local variation be structured within a national standard? Are some factors treated as defined inputs (e.g. seismicity, climate, receiving environment), and how are they consistently applied?
- How should legacy assets transition into the regime?

3 Drinking Water Standards, Rules and Acceptable Solutions

The drinking water regime combines:

- Core duties and standards: suppliers must provide safe drinking water and meet maximum acceptable values (MAVs) in the Drinking Water Standards.
- Quality Assurance Rules (DWQAR): monitoring, treatment and reporting requirements, scaled by supply type, size and risk.
- Acceptable Solutions: deemed-to-comply pathways for defined supply types (primarily smaller or simpler supplies), which provide an alternative compliance pathway (in place of the DWQAR) for eligible supplies.

Relevance to NEDS

The key lesson is around proportionate compliance through pathway design. The regime maintains consistent public health outcomes, while varying how compliance is achieved: standardised pathways (Acceptable Solutions) for repeatable, lower-complexity contexts, and full risk-based assurance for more complex or higher-risk supplies. This illustrates how a national regime can reduce effort where appropriate without weakening outcomes.

Design questions for NEDS

- Are there contexts that are sufficiently repeatable / well-understood to be dealt with through standardised CoPs?
- Which contexts are too complex, site-specific, novel, or high-consequence for a simple deemed-to-comply pathway?
- What must a CoP define to safely provide proportionality?
- What determines the compliance pathway?

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