

National Engineering Design Standards

Launch of Sector Engagement | August-October 2023



Tūtawa mai i runga
Tūtawa mai i raro
Tūtawa mai i roto
Tūtawa mai i waho
Kia tau ai, Te mauri tū
Te mauri ora, ki te katoa
Haumi e, hui e, tāiki e

Come forth from above, below,
within and from the environment
Vitality and wellbeing for all
Strengthened in unity

Introducing

Steve Jones, CEng, BEng (Honours) – University of Brighton. Steve leads Harrison Grierson’s Infrastructure teams across New Zealand. He is a Chartered Civil Engineer with over 35 years’ experience in the Water industry.

He has worked in NZ since 2005 on significant development and three waters and roading infrastructure projects for both the public and private sectors. Previously Steve was lucky enough to have worked through the UK’s Water privatisation programme and worked internationally on several occasions, including a period helping Suez Lyonnaise with a network reticulation research programme in both the UK and France.



Emily Botje is the Asset Management Lead within the Water Services Reform National Transition Unit.

Her team is responsible for maintaining infrastructure investment through transition and developing the National Engineering Design Standards, as well as developing a National Growth and Land Development Framework.

Emily has been working in the asset management space for 25 years with local and international experience and brings with her a wealth of knowledge in the infrastructure management space.





National Engineering Design Standards

To provide for a more efficient and productive water sector we have developed a national technical standard for water, wastewater and stormwater reticulation design and construction.

This work had been known as the Code of Practice; the name is now changing to the National Engineering Design Standards (NEDS).

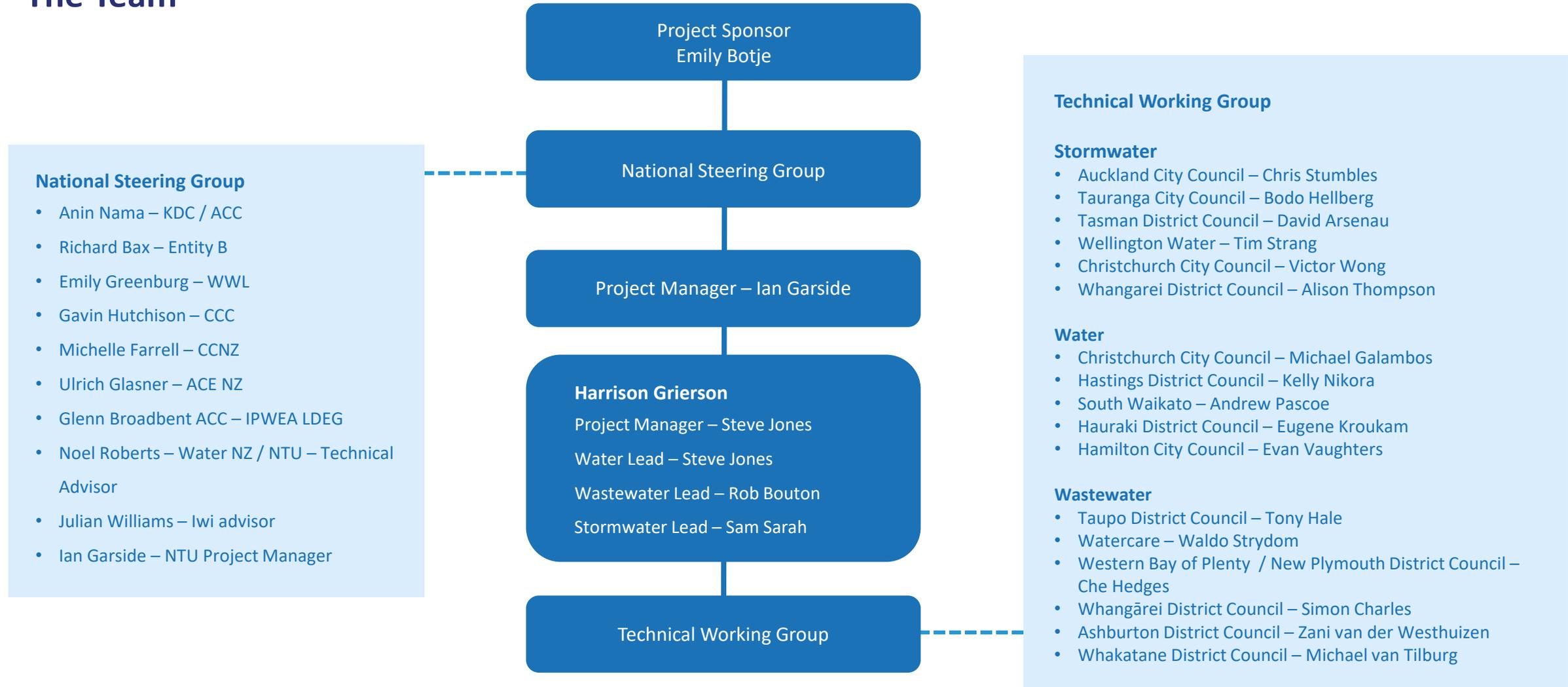
The name change is more reflective of The Water Services Entities Amendment Bill, which requires Water Services Entities to have a development code in place 12 months from their establishment.

NEDS is a required subset of the development code; to specify applicable engineering design and construction standards of water infrastructure.

Each entity is required to have a nationally consistent development code, which will be monitored and enforced by the Commerce Commission.

The NEDS have been developed by council staff with input and guidance from Harrison Grierson. The standards are not government policy and are not envisaged to be managed by Standards New Zealand.

The Team



A glass of water is centered on a blue surface. Light rays from the top left create a pattern of light and shadow across the surface and the glass. The glass is partially filled with water, and the light reflects off the surface of the water and the glass itself.

Project Overview

There are currently 45 different standards of practice providing information on how to design and construct three waters infrastructure.

The sector has been calling for national standards for water for years. Having numerous different standards and codes is an ongoing frustration for many and doesn't support an efficient sector.

The National Engineering Design Standards aim to provide clear and consistent technical standards for the construction and design of drinking, storm, and wastewater across New Zealand.

It is also an opportunity to embed the key principles Te Mana o te Wai and Te Tiriti o Waitangi into the new National Engineering Design Standards.

We have 'lifted and Shifted', the best of the current 45 codes to create a new consistent national standard, which also recognises the need for differing technical requirements due to natural hazards.

We have produced a working draft, which with your help will form the basis of the NEDS Version 1.



Scope of the NEDS Version 1

The NEDS cover entity / public reticulation infrastructure, therefore private infrastructure, treatment plants and reservoirs are excluded.

For green infrastructure, the NEDS refer to current design guidance. No attempt has been made to nationalise this for version 1.

Approved products and materials will be lifted from councils and transferred to the entities as is. No attempt has been made to rationalise or nationalise these.

We have focused on the most common types of infrastructure; some specialised infrastructure has not been included in version 1 – but could be in future versions.

Where there are gaps in New Zealand content we are (under license) filling these gaps with content from WSAA Codes.

Regional variances have been included where there is a need to do so.

We are working with the growth team around processes and linkage to the development code. This is a work in progress and will be included in the February working draft.

Version 1 will be a pdf / paper-based document. It is anticipated that future versions will be electronically enabled.



Format of Current and Proposed Versions

Working Draft – This Version

Four separate documents

- Water
- Wastewater Gravity
- Wastewater Pumped
- Stormwater

Version 1 to be complete April 2024

One Document

1. Foreword
2. Introduction
3. Water
4. Wastewater Gravity
5. Wastewater Pumped
6. Stormwater

Future Version(s)

Potential Future Content

1. Foreword
2. Introduction
3. Water
4. Wastewater Gravity
5. Wastewater Pumped
6. *Pressure Sewer*
7. Stormwater
8. *Green Infrastructure*
9. *Approved Products and Materials*
10. *Other?*

E-enabled



Out of Scope for Version 1

Water	Wastewater	Stormwater
Customer side connections past the last fittings flange of the meter manifold box (water) and boundary (wastewater and stormwater)		
Approved products and materials		
Pipes greater than 300mm		
Treatment plants and reservoirs	Treatment plants	Stormwater pump stations
Pump stations	Ductile iron gravity sewers	
Wellheads	Horizontal and vertical curves in sewers	
	Larger, dry well or transmission wastewater pumping stations	
	Low pressure or vacuum pump networks and systems	
	The use of GRP, PE and PP manholes	

Engagement

Targeted Sector Engagement

We want to share our working draft with you for initial feedback.

We are seeking feedback now from council staff and sector groups who have been involved in the development of the standards. Full public consultation is planned for February 2024.

This is our first working draft; we acknowledge that there will be mistakes and potentially controversial content. With your help we can make these standards robust and future proofed.

Please let us know about

- What you like?
- Are there any fatal flaws?
- Do we have the regional variations right?
- What content should we promote for inclusion in version 2?

There are several ways that you can be involved

- Council staff
 - On-line feedback
 - Face to face workshops
- Sector groups
 - On-line feedback via your sector lead
 - On-line workshop TBC



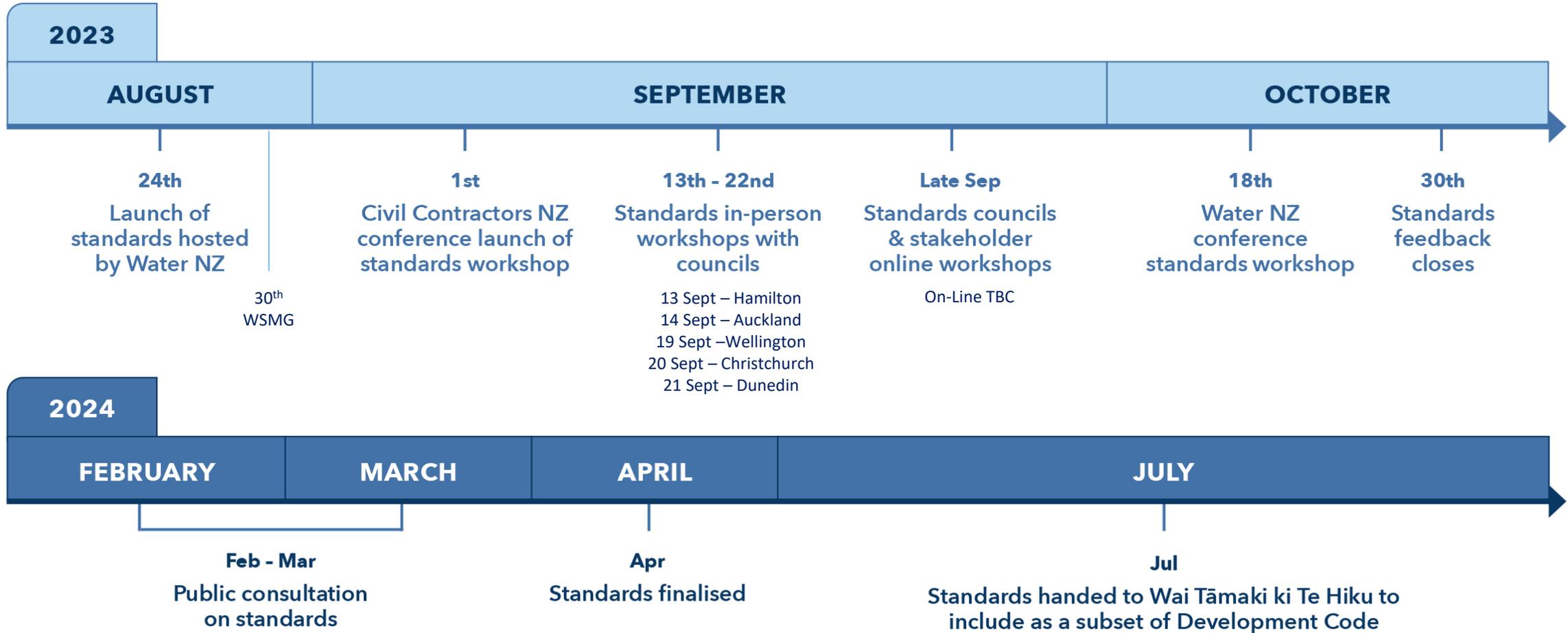
Who we are seeking feedback from

Note:

- You can provide feedback via these organisations if you are staff or a member
- Non-members will be able to provide feedback in February 2024

All our Local Councils and their -Three Waters Teams, Transport Teams and Planning and Development Team	Civil Contractors via CCNZ
Metro Water CCOs – Watercare and Wellington Water	Fire and Emergency NZ (FENZ)
Regional Councils via Te Uru Kahika Compliance Monitoring and Enforcement Group (CME Group)	Design Consultants via ACE NZ
Apōpō (formerly IPWEA) special interest groups – Water and Land Development Engineers Group	Water NZ and their Stormwater and Backflow Special Interests Groups
Kāinga Ora	Taumata Arowai
MBIE – Building Code alignment	Waka Kotahi
Crown Infrastructure Partners - Three Waters Suppliers Forum	

Key Dates



Engagement process for this phase

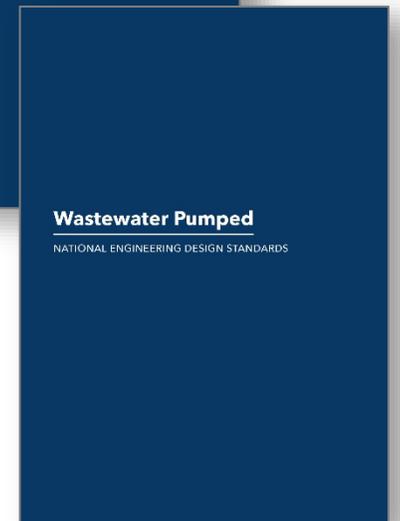
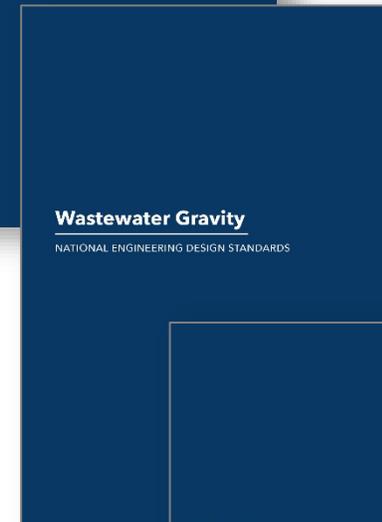
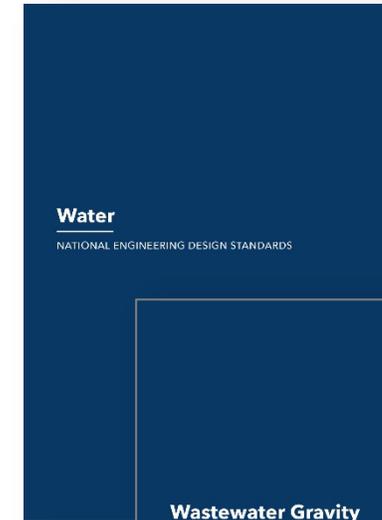
1. A dedicated and secure site has been developed complete with the draft standards and online feedback capacities.
2. We will only be accepting one set of feedback from each organisation, how you manage this is up to you.
3. Feedback opens from 25 August and deadline for feedback is CoB Monday 30 October.
4. We want technical feedback only – identify gaps, opportunities and recommendations.
5. You will have a chance to discuss with us the Standards through planned workshops
 - CCNZ Conference 1 September
 - Council in-person and on-line workshops – mid to late September
 - Water NZ Conference 18 October
 - On-line workshops TBC.
6. We will respond to all feedback submissions in November 2023.
7. You won't miss out - there is opportunity for wider stakeholder and public consultation in February 2024. We will tell you more about this in January 2024.

How you will access the engagement platform

1. Post this launch event your identified key contact will be sent an email invitation to validate their email for system access.
2. Instructions for accessing this secure engagement platform will be provided on that invitation.
3. Once you have your key contact's access granted, they can open the standards documents.
4. Instructions on use and FAQs will be available on this site.
5. The standards can be downloaded and shared within your organisation with those who will be contributing feedback.
6. You can come in and out of the engagement platform by simply closing the application, the system will automatically save your entry.

National Engineering Design Standards – Working Draft

A Glance of the Standards



PART ONE - PLANNING AND DESIGN

This section sets out requirements for the planning and design of water networks for network upgrades, land development, and subdivision. It covers the design of water pipes for the purpose of supplying water for drinking, including restricted flow supply, and firefighting purposes up to and including 300mm diameter. All trunk mains, booster pump stations, reservoirs and pressure management devices will require specific design in conjunction with the WSE and are excluded.

1 GENERAL

Where investigations and reports are required by a suitably qualified person, this person or persons will have nationally recognised qualifications and accreditation, such as Chartered Professional Engineer (CPEng), Registered Professional Surveyor or Licensed Cadastral Surveyor.

The person or persons will normally be expected to be professionally recognised in the area of competence claimed and to carry professional indemnity insurance to a level suitable for the purpose.

The Water Services Entity (WSE) reserves the right to have any work peer reviewed regardless of any prior approval as to the acceptability of the suitably qualified person. The cost of all peer review work will be borne by the developer.

Without limiting the Entity's rights to require the use of suitably qualified persons the following are examples of areas of expertise, together with the expected minimum qualifications where such people may be required:

- h) Geotechnical engineering (CPEng with recognised discipline competence);
- i) Traffic and transportation engineering (CPEng with recognised discipline competence);
- j) Potable water supply engineering (CPEng with recognised discipline competence);
- k) Landscape design and practice (Registered Landscape Architect);
- l) Land surveyor (subdivision plans) (Registered Professional Surveyor, Registered Engineering Surveyor or Licensed Cadastral Surveyor);
- m) Land legalisation, subdivision lots, roads, reserves etc. (Registered Professional Surveyor and Licensed Cadastral Surveyor).

1.1 SCOPE

This Code covers the design of water pipes for the purpose of supplying water for drinking, including restricted flow supply, and firefighting purposes up to and including 300mm diameter. All trunk mains, booster pump stations, reservoirs and pressure management devices will require specific design in conjunction with the WSE and are excluded.

1.2 PLANNING AND DESIGN

1.2.1 Scope and requirements

To supply the required quality and quantity of water to all customers as required by legislation and to the WSE's minimum level of service. The design of the water network must ensure both:

- a) An acceptable water supply for each property, including fire flows, by providing a service connection from the watermain to each property; and
- b) Where the area is in an urban fire district, the required firefighting water supply to the general area.

Designers must consider the hydraulic adequacy of the network including the specified levels of service, water quality and impact on the existing network.

The water network must meet the minimum design life requirements of 100 years taking into account structural strength, design loadings, seismic resilience, soil conditions and water conditions (internal and external corrosion).

The water network must be cost efficient over its design life while accounting for environmental and community impacts through integrated three waters management and water conservation. It should also allow for condition assessment to assess its condition when nearing the end of its design life to optimize renewal strategies.

Table 2-1 - Residential Design Occupancy Allowances

Number of Bedrooms	Occupancy for Design Purposes
1	2
2-4	3
5+	Specific agreement with Entity
Unknown	Assume a design occupancy of 3 per dwelling unit

Notes:

Where large dwellings are proposed, which have additional rooms beyond those allocated as dining, lounge, and bedroom e.g., family, office, study or sleep outs which have the potential to be used as bedrooms, an additional occupancy allowance should be made on the basis of 1 extra person times the ratio of the total floor area of the additional room(s) to that of the smallest designated bedroom.

For residential retirement villages without a hospital facility and that have single bedroom units then a design occupancy rate of 1.5 may be considered.

- a) Average daily consumption figures for the specific network shall be provided by the WSE.
- b) Where figures for the network are not available assume:
 - i. 275 L/person/d for networks with universal metering and volumetric water billing
 - ii. 325 L/person/d for networks with no controls on water use
 - iii. 200 L/person/d for residential apartment buildings

2.4.3.4 Non-residential

Non-residential (commercial, industrial, or reserve) area design flow rates shall consider land area, lot sizes, land use type and requirements of individual businesses. Reserve, park, and sports field flows shall consider climate and rainfall and may require expert advice on irrigation requirements for plants or grass. Non-residential design flows require WSE approval prior to commencing detailed design.

Table 2-2 - Non-Residential / Other Facility Design Occupancy Allowances

Commercial Facility Types	Design Water Flow Allowance	
Hospitals	Day Facility (treatment facilities, wards)	320 Litres per bed per day
	Night and Day Facility (24 hour operation)	630 Litres per bed per day
	Staff	50 Litres per employee per day
Child Day Care	Children	45 Litres per child per day
	Staff	50 Litres per employee per day
School (day students)	Primary School	20 Litres per student per day
	Secondary School	25 Litres per student per day
	Staff	50 Litres per employee per day

PART TWO – CONSTRUCTION

This section sets out requirements for the construction of water networks, for network upgrades, land development, and subdivision. It covers the construction, testing, commissioning and handover of water pipes for the purpose of supplying water for drinking, including restricted flow supply, and firefighting purposes up to and including 300mm diameter. All trunk mains, booster pump stations and reservoirs will require specific design in conjunction with the WSE and are excluded from this Code.

9 GENERAL

9.1 SCOPE

This Code of Practice applies to all civil construction work for infrastructure delivered by, or vested to, the WSE. For consistency of approach, the earthworks and geotechnical requirements for any land development project conducted in accordance with the Three Waters National Code of Practice, must follow Part 2: Earthworks and Geotechnical Requirements of New Zealand Standard NZS 4404:20103 and the requirements given in this Section. This Section provides further specific requirements for land development projects to be completed in accordance with the Three Waters National Code of Practice. Where there is any doubt or inferred conflict between the requirements of NZS 4404:2010 and additional requirements of this Part, the Three Waters National Code of Practice must be deemed to govern, unless written confirmation is provided by the WSE for a specific land development project.

9.2 Health and Safety

All work shall be conducted in accordance with the requirements of the Health and Safety at Work Act 2015. The WSE requires that all contractors undergo a Health and Safety induction programme provided by the Entity prior to any work progressing. Health and safety is the responsibility of every person.

The minimum health and safety requirements set out by the WSE must be adhered to and the documentation and procedures must be of an acceptable standard:

- Describe the processes to assure compliance with systems, good practice and legislation.
- Provide information to demonstrate that the Health and Safety Management System is capable of managing specific hazards and meeting The WSE minimum requirements. Regulations, approved Codes of practice and industry standards or guidelines should be referenced as the basis for hazard controls.
- Provide a Health and Safety Management Plan which addresses controls and unique high-risk activities or components of the work.
- Demonstrate the proposed risk controls are adequate and identify alternatives to further reduce risk. Where administrative controls are used, it must be demonstrated that these are sufficient, robust and how they will be properly managed.
- Provide the names of Health and Safety staff and their responsibilities.
- Verify that all workers have received adequate training for managing the hazards and risks and undertaking the work safely.
- Conduct and record site specific inductions.
- Where work is on an existing facility or asset, a Permit to Work is required before any work can start.

10 GENERAL CONSTRUCTION

10.1 GENERAL

Construction of the water reticulation system must not start until acceptance in writing has been given and plan approval granted by the WSE.

92 | Water Services Reform – Water Supply Code of Practice | Draft V0.8 – July 23

13.3 SPECIAL PIPE SUPPORT FOR NON-SUPPORTIVE SOILS

Where SCALA penetrometer testing shows 3 or fewer blows per 50mm penetration an additional 300-600mm excavation up to a maximum depth of 3.0m may be performed in search of denser soil. New, deeper excavation bases shall be compacted and tested with a Scala penetrometer. Where the deeper base achieves a result of at least 4 blows per 50 mm of penetration the additional excavation shall be backfilled with a raft foundation as per WS25.

Where the total excavation depth exceeds 3.0m or results of 4 blows per 50mm cannot be achieved a site specific design is required. Site specific trench designs shall be based on geotechnical findings and ensure that there is no risk of subsidence, hydrostatic uplift or any other soil conditions that may compromise the pipeline integrity.

14 PIPE LAYING, JOINTING AND CONNECTING

14.1 INSTALLATION OF PIPES

This section covers the general civil construction of underground pipelines and ducting for The WSE's services. Works shall be completed ordinarily in accordance with AS/NZS2566 and as may otherwise be specified in this section.

This section does not include mechanical construction requirements for particular requirements of welding, flanges and fittings. Refer to section 15.20 for laying and welding steel pipelines or section 15.21 for welding and laying PE pipelines.

Where 'pipe' or 'piping' is referred to in this section it shall be read to also mean any pipe or conduit for the purpose of ducting.

14.1.1 General

Subsections for specific construction methods shall be read in conjunction with these general requirements.

Pipe shall be transported and handled according to the manufacturer's requirements for the specific material type to avoid damage.

Pipe shall be stacked not more than three layers high or as otherwise specified by the manufacturer's recommendations and without placing excessive loads on the lower layers. Stacks shall be arranged not to place any load on pipe ends. Pipe supports shall not create point loads on the pipe.

Pipe ends shall be capped.

Excess pipe (where supplied by The WSE under contract) shall be returned to the specified The WSE storage facility.

All non-metallic pipelines shall have an accepted tracer wire installed over the entire length of the installation (refer section C3.1.7) with suitable connecting stations where practicable. Additionally, pipe installed by open trench methods shall have an applicable warning strip e.g., "CAUTION – WATER MAIN BELOW" or an approved equivalent of minimum 100mm width at 450mm above the pipe. The service appropriate colour coding shall be blue to AS/NZS2648.

Trench bedding and pipe surround shall be progressively inspected as the work continues. Pipe shall not be installed before a new section of bedding has been inspected.

Open trenches shall not progress more than 75m ahead of completely backfilled and sealed section or as otherwise limited by the controlling authority.

Flexible pipelines as defined by AS/NZS2566 shall be tested for oval caused by superimposed loads and inappropriate sidewall support. On completion of the pipe installation (for any pipe laying technique) the pipe shall be tested by pigging or laser scanning (where more practical for larger diameters).

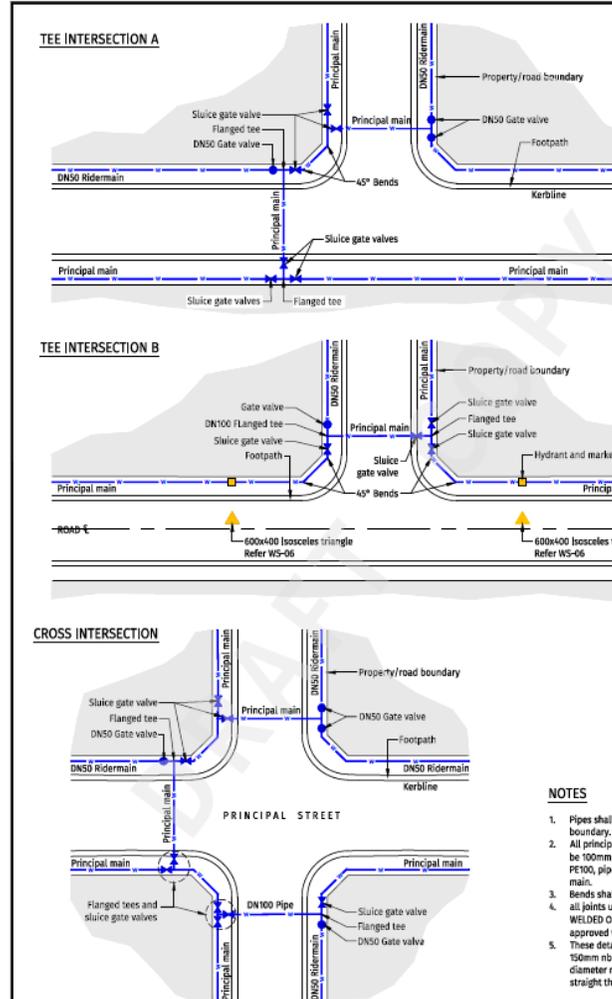
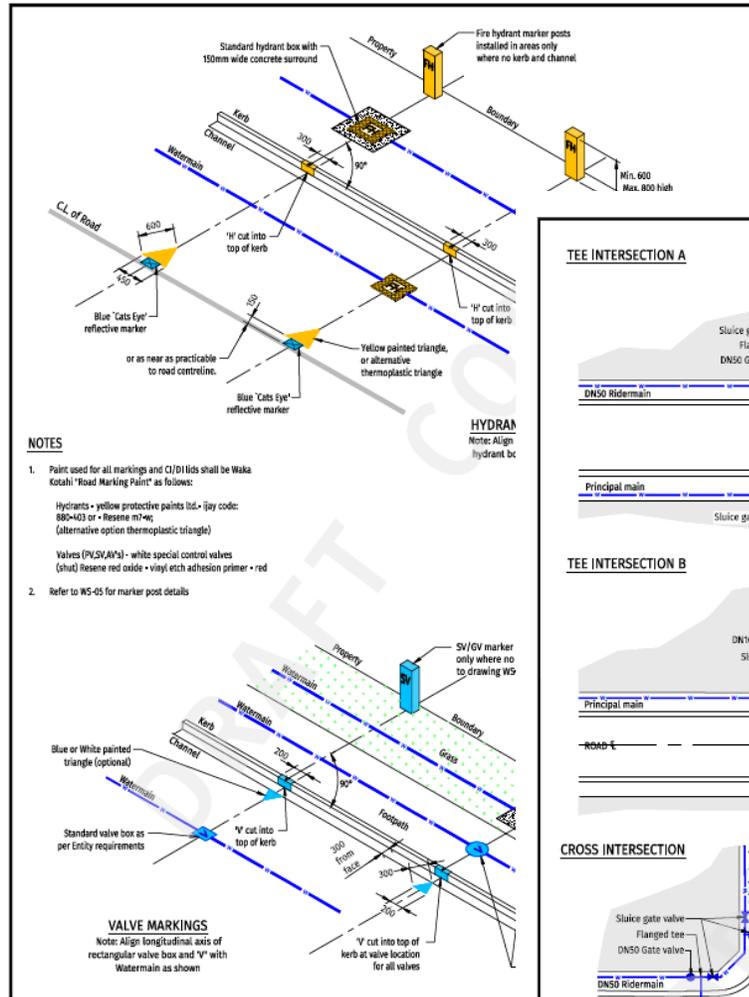
14.1.2 Cleaning, inspection, and joint preparation

Clean and examine all pipeline system items before installation. Inspect each joint seal for fit and flaws before making the joint in accordance with the manufacturer's instructions. Do not use damaged, dirty, or incorrect seals. Ensure that the correct joint lubricant is used for rubber seals.

108 | Water Services Reform – Water Supply Code of Practice | Draft V0.3 – June 23

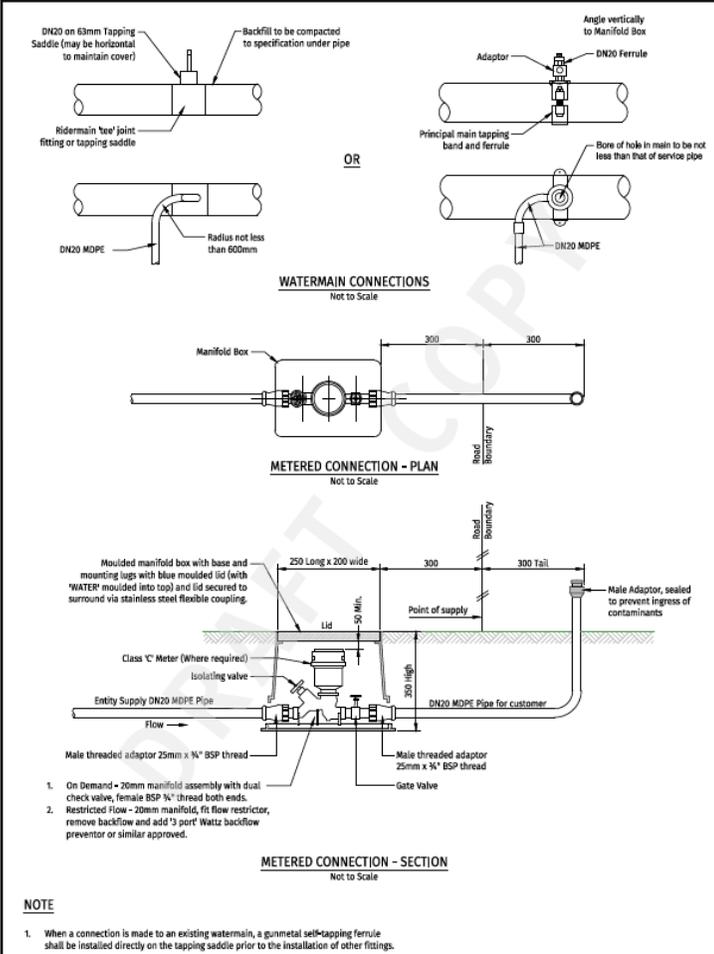
Appendices

Appendices No.	Description
Appendix A	Water Standard Drawings
DRAWING No	Drawing Title
WS-01	Water Supply Customer Connection Layouts
WS-02	Water Supply Intersection Layout
WS-03	Water Supply Looped and Linked Main
WS-04	Water Supply Valve and Hydrant Markings
WS-05	Water Supply Valve Marker Post
WS-06	Water Supply Hydrant Detail on New Main Flanged Tee
WS-07	Water Supply Hydrant Detail on Existing Main Socketed Tee
WS-08	Water Supply Sluice Valve ≥ DN80
WS-09	Water Supply Gate Valve ≤ DN50
WS-10	Water Supply Trench Re-Installation Details
WS-11	Water Supply Trench Bedding – Soft Ground
WS-12	Water Supply Thrust Block – Bend/Elbow
WS-13	Water Supply Thrust Block – Tees
WS-14	Water Supply Thrust Block – In-line/Taper
WS-15	Water Supply Pipeline Waterstop
WS-16	Water Supply EF Tapping Saddle Connection
WS-17	Water Supply Commercial Meter and Backflow Connection
WS-18	Water Supply DN20 Metered and Unmetered Service Connection
WS-19	Water Supply Customer Connection Restricted Supply
WS-20	Water Supply Fire Suppression Supply and Separate Water Supply
Appendix B	Water Guidelines Matrix
Appendix C	Safety in Design Risk Register
Appendix D	Omissions & Opportunities Register
Appendix E	Concrete construction checklist
Appendix F	General Requirements for Site Butt Fusion Joining
Appendix G	Electrofusion Welding Check Sheet
Appendix H	Compliance Requirement Check Sheet



NOTES

- Pipes shall be laid parallel with the boundary.
- All principal main road crossings shall be 100mm dia. (or larger) DI, steel or PE100, pipes extending from main to main.
- Bends shall be long radius bends.
- all joints under roads shall be field WELDED OR Flanged joints (wrapped in approved wrapping system).
- These details apply to 100mm rb and 150mm rb principal mains. larger diameter mains shall generally pass straight through intersections.



Pātai

If you have pātai or comments please send them to:

waterservicesreformtechnical@dia.govt.nz



Pātai? | Questions?

