WATER NEW ZEALAND COMPETENCY FRAMEWORK

Overview

water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Water New Zealand Competency Framework Overview

ABOUT WATER NEW ZEALAND

Water New Zealand is a national not-for-profit sector organisation comprising approximately 1900 corporate and individual members in New Zealand and overseas.

Water New Zealand is the principal voice for the water sector, focusing on the sustainable management and promotion of the water environment and encompassing the three waters: drinking water, waste and storm waters.

www.waternz.org.nz

KEY CONTRIBUTORS

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The Water New Zealand Competency Framework is still in the development stage and we are interested in your feedback as we develop it further. If you have any questions, queries or comments, please contact training@waternz.org.nz.

Further refinements of this framework will be issued on the Water New Zealand website.

www.waternz.org.nz/competence

Executive Summary

A workforce with the right skills and capabilities is key to developing an effective, efficient, accountable and resilient three waters sector in New Zealand.

The Water New Zealand Competency Framework describes what people should be **able to do** and what they **need to know** to competently undertake their work.

This competency framework is a work in progress and should be viewed as the first step in a journey the water sector in New Zealand is taking to upskill a fit-for-purpose workforce. The framework is being developed on a role-by-role basis, beginning with treatment operator roles, the people who **operate** and **maintain** water and wastewater services, as a starting point.

Currently this competency framework includes the following roles:

- ***Drinking Water Treatment Operators***. These are the people who operate the systems and equipment that are used to treat raw water so that it can be supplied to the community. They operate water treatment processes like chemical dosing, filtration and disinfection. They collect and analyse data on the processes and carry out first line maintenance tasks.

- ***Wastewater Treatment Operators***. These are the people who operate the systems and equipment that are used to ensure that sewage is treated before being returned to the environment. They operate wastewater treatment processes such as preliminary and biological treatment, they collect and analyse data on the processes, and carry out first line maintenance tasks.

- ***Drinking Water Distribution Operators***. These are the people who look after the pipes, mains, service reservoirs and pumping stations that supply the community with water. They carry out planned, preventative maintenance as well as respond to incidents such as burst pipes and major leaks.

- ***Wastewater Network Operators.*** These are the people who look after the sewers and pumping stations which carry wastewater from people's homes to wastewater treatment plants. They carry out planned and preventative maintenance and they also diagnose and respond to faults and blockages.

The framework is intended to help the water industry to identify the knowledge and skills required by their workforce, to help assess levels of staff training that may be required and to develop training programmes.

Contents

Executive Summary 3
What is the Water New Zealand Competency Framework? 5
Approach to developing the Framework 5
Structure and Content of the Framework 5
Key purpose statement for people working in the three waters industry 6
Key Roles needed to achieve effective three water services 7
Map of the Water New Zealand Competency Framework 9
Using the Framework 11
Personal Qualities and Skills 12
Role Profiles 13
Drinking Water Treatment Operator Profile 14
Drinking Water Treatment Operator Elements of Competence 14
Wastewater Treatment Operator Profile 16
Wastewater Treatment Operator Elements of Competence 16
Drinking Water Distribution Operator Profile 18
Drinking Water Distribution Operator Elements of Competence 18
Wastewater Network Operator Profile 20
Wastewater Network Operator Elements of Competence 20
References 22

What is the Water New Zealand Competency Framework?

The Water New Zealand Competency Framework (the Framework) identifies what the workforce:

- Need to be able to do, and
- Need to know

In order to protect the health of the public by safely and effectively deliver three waters services to the community.

While the Framework describes what people working in the three waters industry in New Zealand should be able to do and indicates what they ought to know and understand it does not define how well they should be able to perform or how this should be assessed.

Approach to developing the Framework

The Framework is based on the Institute of Asset Management (IAM) Competency Framework [1] [2] which has been customised to suit the three waters sector in New Zealand. Its contents support the principles and requirements of the ISO 55000 series of standards for Asset Management [3] [4] [5].

Structure and Content of the Framework

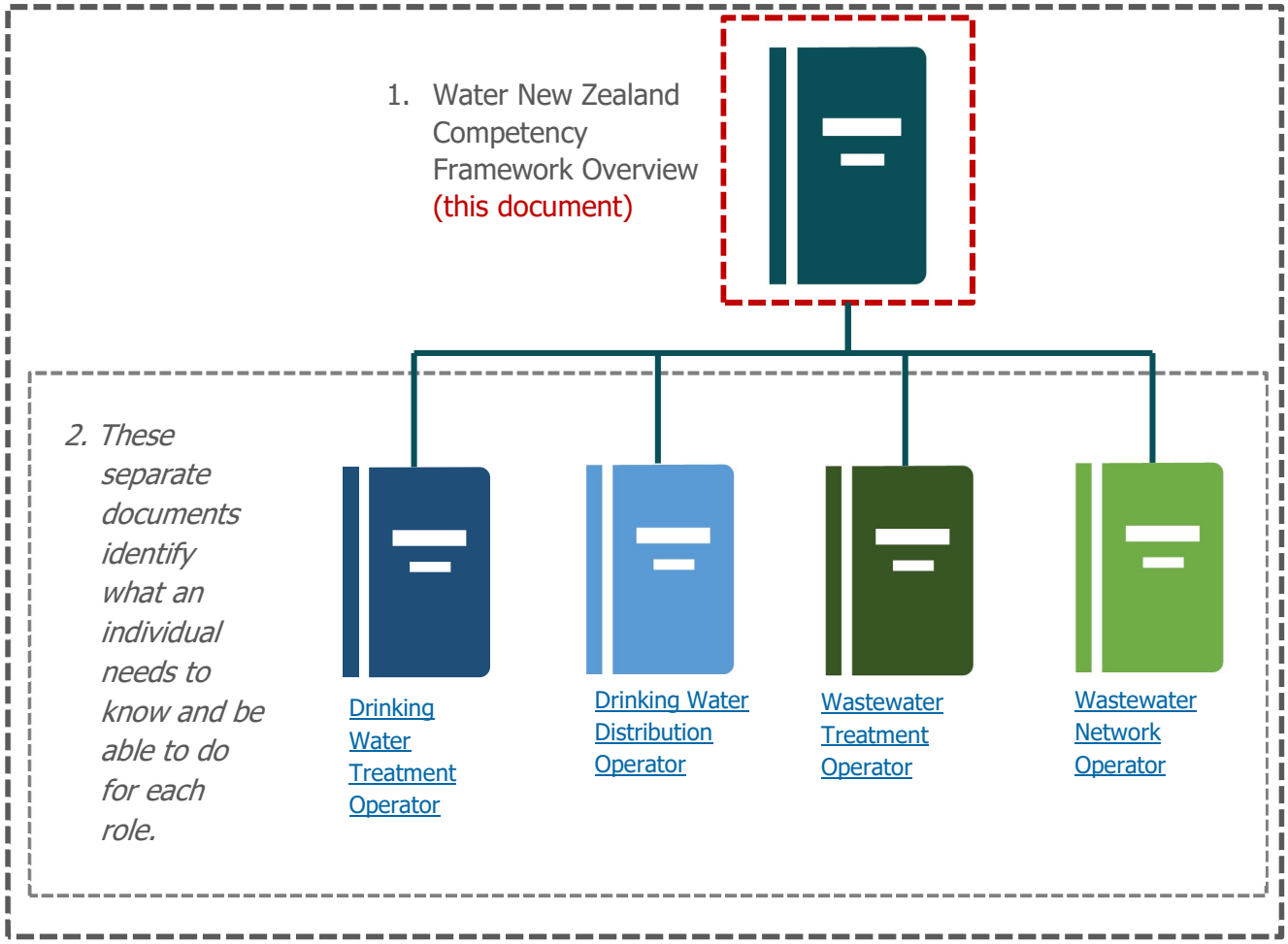
The Framework has been structured into a suite of documents, as shown in Figure 1 on the following page.

These documents include:

1. The Water New Zealand Competency Framework Overview (this document) which covers:
    - A key purpose statement for people working in the three waters industry
    - The key roles needed to achieve this purpose
    - The map of the Water New Zealand Competency Framework which identifies units of competence for each key role against the three waters landscape in New Zealand.

2. Individual documents which define the elements of competence for each of these role profiles:
    - Drinking Water Treatment Operator
    - Wastewater Treatment Operator
    - Drinking Water Distribution Operator, and
    - Wastewater Network Operator.

Figure 1: Water New Zealand Competency Framework Suite of Documents



Key purpose statement for people working in the three waters industry

The Department of Internal Affairs identified a key purpose statement for the three waters industry as part of their three waters review process [6]. The Framework has been developed with this key purpose in mind.

- **Our health and safety**: depends on safe drinking water, safe disposal of wastewater and effective stormwater drainage.
- **Our prosperity**: depends on adequate supply of cost effective three waters services for housing, businesses and community services.
- **Our environment**: depends on well managed extraction of drinking water, and careful disposal of wastewater and stormwater.

Key Roles needed to achieve effective three water services

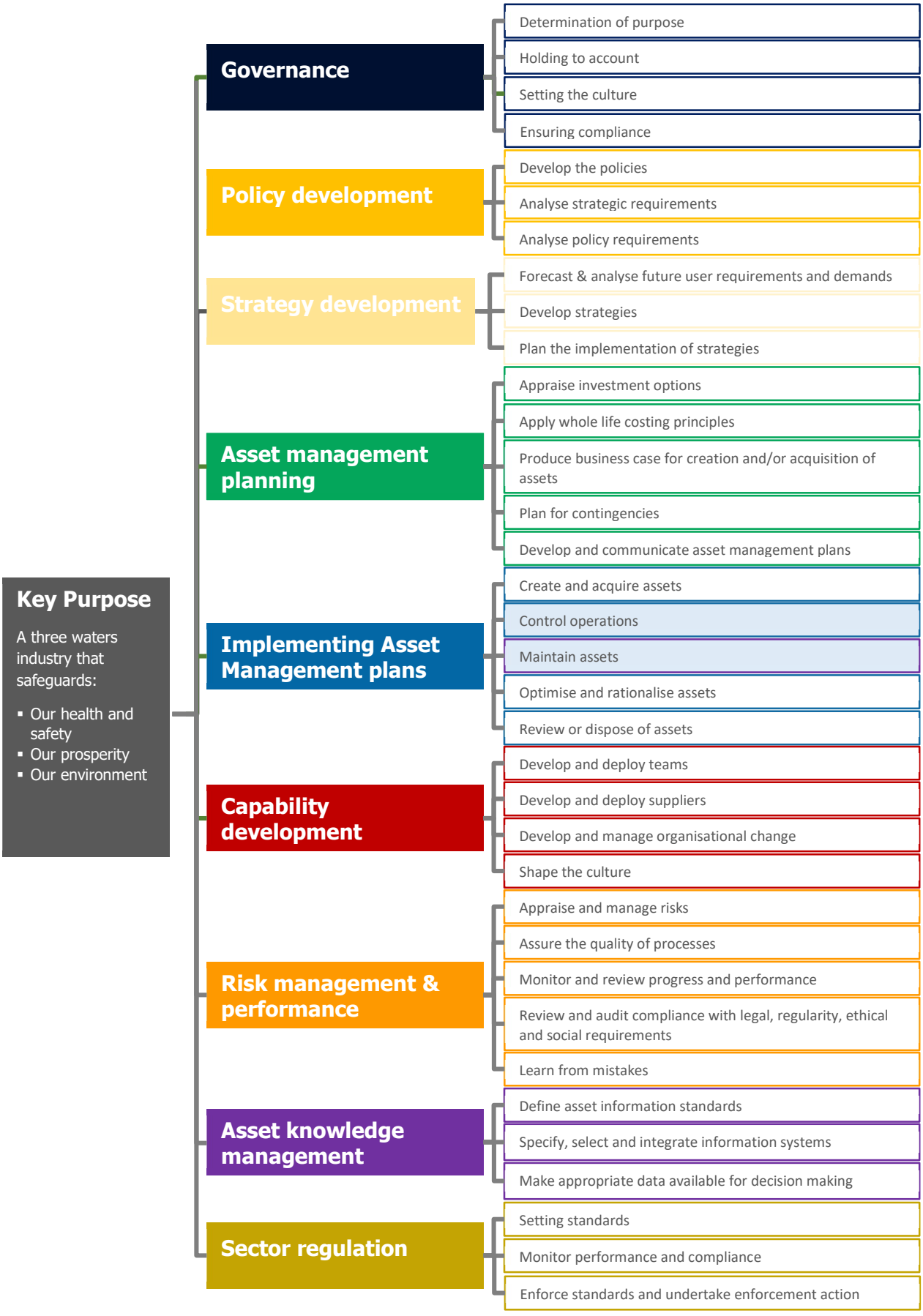
Three water services in New Zealand are delivered by people working within a wide range of roles. The precise mix of competencies required by any one organisation will depend on the circumstances in which they are operating. Typically, this will involve people working within the following areas:

1	Governance
2	Policy development
3	Strategy development
4	Asset Management planning
5	Implementing Asset Management plans
6	Capability development
7	Risk management and performance improvement
8	Asset knowledge management
9	Sector regulation

Figure 2 on the following page lists the units of competence for each of the roles.

The first stage of the development of the Framework has focused on treatment operator roles, that is the people who **control operations** and **maintain assets** at water and wastewater treatment facilities and distribution networks as part of the **implementing asset management plans** stage of delivering safe and effective three waters services.

Figure 2: Key purpose, roles and units of competence for roles within the New Zealand three waters industry (1)



Map of the Water New Zealand Competency Framework

The units of competence identified for each role have been mapped in Figure 3 against the breadth of work undertaken within the three waters industry in New Zealand. This map has been adapted and customized for the three waters industry in New Zealand from the IAM Competences Framework [1].

To date work on the Water New Zealand Competency Framework has focussed on operator roles, that is the people who are involved in controlling operations and also maintaining water and wastewater assets. This current extent of the competency framework is highlighted by the red ticks in Figure 3 below, whilst the grey ticks show where the framework will be developed in the future for other roles within the sector.

Figure 3: Map of the Water New Zealand Competency Framework. Adapted from the IAM Competences Framework.

The New Zealand 3 Waters Landscape																																													
		STRATEGY AND PLANNING						ASSET MANAGEMENT DECISION-MAKING					LIFECYCLE DELIVERY												ASSET INFORMATION				ORGANISATION AND PEOPLE ENABLERS				RISK AND REVIEW														
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39					
Key Roles	*Units of Competence*	Governance, Legal and Regulatory Frameworks	Asset Management Policy	Asset Management Strategy	Demand Analysis	Strategic Planning	Asset Management Plans	Capital Investment Decision-Making	Operations and Maintenance Decision-Making	Lifecycle Cost & Value Optimisation	Resourcing Strategy & Optimisation	Shutdowns and Outage Strategy & Optimisation	Technical Standards and Legislation	Asset Creation & Acquisition	Systems Engineering	Configuration Management	Maintenance Delivery	Reliability Engineering & Root Cause Analysis	Asset Operations	Resource Management	Shutdown and Outage Management	Fault & Incident Response	Asset Decommissioning and Disposal	Asset Information Strategy	Asset Knowledge Standards	Asset Information Systems	Data & Information Management	Procurement & Supplier Management	Asset Management Leadership	Organisational Structure	Organisational Culture	Competence Management	Risk Assessment and Management	Contingency Planning & Resilience Analysis	Sustainable Development	Management of Change	Assets Performance & Health Monitoring	Asset Management System Monitoring	Management Review, Audit and Assurance	Asset Costing and Valuation	Stakeholder Engagement					
Governance	Determination of Purpose	✓	✓	✓																																					✓					
	Holding to Account																												✓																	
	Setting the culture																														✓															
	Ensuring compliance																																						✓							
Policy Development	Analyse policy requirements		✓																																						✓					
	Develop the policies		✓																																											
Strategy Development	Analyse strategic requirements			✓	✓																																				✓					
	Forecast and analyse future user requirements and demands				✓																																									
	Develop strategies			✓																																										
	Plan the implementation of the strategies			✓		✓																																								
Asset Management Planning	Appraise investment options							✓																																		✓					
	Apply whole life costing principles							✓		✓																																					
	Produce business case for creation and/or acquisition of assets							✓																																							
	Plan for contingencies						✓																																								
	Develop and communicate AM plan(s)					✓	✓	✓	✓	✓	✓	✓																																			
Implementing Asset Management Plans	Create and acquire assets												✓	✓	✓	✓												✓																		
	Control operations	✓							✓			✓	✓				✓	✓	✓		✓	✓	✓				✓					✓						✓							
	Maintain assets								✓			✓	✓				✓	✓	✓		✓	✓	✓				✓					✓						✓							
	Optimise and rationalise assets																						✓																						
	Renew or dispose of assets																						✓																						
Capability Development	Develop and deploy people and teams																			✓										✓		✓													
	Develop and deploy suppliers																												✓																
	Design and manage organisational change																														✓													
	Shape the culture																														✓													
Risk Management and Performance Improvement	Assess and manage risks																															✓		✓	✓									
	Assure the quality of processes																																			✓								
	Monitor and review progress and performance																																				✓	✓					
	Review and audit compliance with legal, regulatory, ethical and social requirements																																						✓				
	Learn from incidents																					✓																	✓				
Asset Knowledge	Define asset information requirements																							✓	✓	✓	✓																
	Specify, select and integrate AM information systems																											✓															
	Make appropriate AM information available for decision making																												✓														
Sector Regulation	Setting standards	✓																																							✓			
	Monitor performance and compliance																																			✓			✓				
	Enforce standards and undertake enforcement action																														✓					✓							

Using the Framework

The Water New Zealand Competency Framework aims to set out the full range of knowledge and skills that people involved in the three waters industry in New Zealand might need to know and be able to do.

No one person at an organisation will be competent in all elements that this Framework details.

Different sections of the elements of competence will be appropriate for senior operators in a managerial role, with other elements appropriate for new entrants to the industry. For this framework to be most effective organisations will need to have a culture that promotes the continuous development and growth of their team members.

The Framework can be used for:

Sector Development	▪ Identify the current state of capability ▪ Build a consistent profile for roles to use within the sector ▪ Develop learning and training pathways ▪ Build industry capability ▪ Implement a continuous improvement approach to capability ▪ Future proof the sector
Individual Development	▪ Identify the capabilities a person requires to perform well in their role ▪ Identify professional development needs ▪ Address team member development needs during performance discussions ▪ Compare a person's perception of how well they are doing their job compared to how well others think they are doing their job ▪ Support individual career planning ▪ Identify any gaps in skills, knowledge and behaviours that individuals want to develop for the future
Recruitment	▪ Understand what capabilities are considered important ▪ Develop selection criteria when filling positions ▪ Map an applicant's capability ▪ Use competencies in an employment interview
Organisational Development	▪ Build capability within an organisation ▪ Clarify what skills are important in different roles ▪ Prepare career development pathways ▪ Map induction processes ▪ Heat map capability compared to industry standards

Personal Qualities and Skills

The Framework identifies the technical skills and knowledge that Operators will require to perform competently; however, it does not explicitly identify what personal qualities or "soft skills" are required.

Some examples of soft skills that people in the three waters industry need to underpin their work include:

Having an active curiosity	People must have an active curiosity. They need to be able to identify when something is not quite right and be able to figure out what might be causing it.
Willingness to ask questions	You do not need to figure things out on your own. Being willing to ask questions will help to shorten your learning curve while building relationships with those that you work with. Knowing when you're out of your depth and knowing when to ask for help is an essential skill.
Solution seeking skills	No matter how junior your role, you need to be able to make recommendations to your manager and team with justifications for your recommendation. You need to be able to offer your opinion on next steps and decisions rather than looking to others to tell you what to do.
Relationship building	You must learn to build relationships. The key to success is getting things done with other people.
Effective communication skills	You will need to work with other people to successfully undertake your work. Being able to effectively with a wide range of different audiences is essential. This can include people in the community, contractors, regulators and others within your team and wider organisation.
Ability to contextualize	You need an understanding of how your efforts fit into the bigger picture of safeguarding: ▪ Our health ▪ Our prosperity ▪ Our environment
Shares Information	Other people rely on the information that you supply to be able to effectively do their work. You need to be aware of their requirements and share information with them.

Role Profiles

This section of the Water New Zealand Competency Framework Overview summarises the typical role profiles covered by the framework and identifies a list of elements of competence relevant to each role in the context of operating and maintaining water and wastewater assets.

While this section provides a summary of the competences required by each type of operator, the following individual documents within the framework should be referred to for more details.

- Water New Zealand Competency Framework: Drinking Water Treatment Operator
- Water New Zealand Competency Framework: Wastewater Treatment Operator
- Water New Zealand Competency Framework: Water Distribution Operator, and
- Water New Zealand Competency Framework: Wastewater Network Operator.

These documents drill down into each element of competence to identify what it is that an operator needs to know and be able to do for their role.

Drinking Water Treatment Operator Profile

Drinking Water Treatment Operators take a risk management approach to protect the health of the public. They fulfil a crucial role in ensuring that New Zealand communities are supplied with safe and sufficient water.

They need to have a full understanding of risk assessments and incident and emergency procedures that are documented within the Water Safety Plans that they are responsible for implementing.

To competently carry out their role Drinking Water Treatment Operators need to understand water treatment theories and principles to ensure that processes such as filtration, disinfection and coagulation and clarification are maintained, and the operation of these processes is monitored and controlled. When a fault occurs within a water treatment plant, the Drinking Water Treatment Operator finds the cause of the fault and ensures that it is resolved as quickly as possible

Drinking Water Treatment Operator Elements of Competence

The table on the following page lists the elements of competence that are relevant to those roles that **Control Operations** and **Maintain Assets** in the context of operating and maintaining a Water Treatment Plant.

Refer to the Water New Zealand Competency Framework: Drinking Water Treatment Operator document where each element of competence is further drilled down into to give context in a Water Treatment environment, and to identify what it is a Drinking Water Treatment operator needs to know and be able to do.

No one person at an organisation will be expected to be competent in all elements that this Framework details. The entire breadth of which knowledge and skills will be required by any operator will depend on the type of technology used by each Water Supplier. It will also depend on the depth of experience held within the team that the operator works within; some of the elements of competence will be appropriate for senior operators in a managerial role with other elements appropriate for new entrants to the industry.

What does someone who operates and maintains a Water Treatment Plant need to know and be able to do?

Water NZ Competency Framework Link & Context		Elements of Competence
Strategy & Planning	**Governance, Legislation and Regulatory Frameworks** Water Treatment Operators are typically employed by Local Government either directly or via an outsourcing contract. They need an understanding of the governance, legal and regulatory frameworks that they are expected to operate within. Everybody involved in the water industry also needs to understand the spiritual and cultural significance of water to Tangata Whenua.	▪ Governance, Legislation and Regulatory Frameworks ▪ The Principles of Safe Drinking Water ▪ Development of Water Safety Plans ▪ The Role of the Drinking-water Standards for New Zealand ▪ Te Mana o te Wai
Asset Management Decision Making	**Operations and Maintenance Decision Making** Decisions made by Water Treatment Operators must reflect and support the principles of delivering safe drinking water as well as the activities and processes involved in determining operations and maintenance requirements.	▪ Critical Control Points ▪ Operational Monitoring and Inspection for Process Control ▪ Apply a Knowledge of Science to Water Treatment Processes
Lifecycle Delivery	**Technical Standards** The activities that Water Treatment Operators are responsible for must comply with relevant technical standards.	▪ Technical Standards related to Water Treatment
	Maintenance Delivery Water Treatment Operators need to be able to safely maintain the different types of equipment used in the delivery of water treatment	▪ Safe Isolation of Plant and Equipment ▪ Drinking Water Hygiene requirements ▪ Maintenance and Repairs of Water Treatment Equipment ▪ Validation and Calibration of Monitoring Equipment ▪ Inventory Management ▪ Cranes and Lifting Equipment ▪ Maintaining Specified Building Systems
	Reliability Engineering & Root Cause Analysis Water Treatment Operators need to be able to ensure that potential problems are identified as early as possible in an assets' life cycle, identifying the root cause of any lack of reliability	▪ Root Cause Analysis
	Asset Operations and Optimisation Water Treatment Operators monitor, operate, control and optimise water treatment assets to ensure they operate in a manner that meets their objectives, within appropriate design, maintenance and operational parameters.	▪ Water Demand and Hydraulics ▪ Use Automated Systems to control the Process Plant and Collect Data ▪ Operate the Source Water Abstraction Process ▪ Operate Pre-treatment Processes ▪ Operate Coagulation and Clarification Processes ▪ Operate Filtration and Adsorption Processes ▪ Operate Sludge Dewatering and Disposal Processes ▪ Operate Disinfection Processes ▪ Operate Treatment Processes for Aesthetic Considerations ▪ Operate Fluoridation Processes ▪ Operate Water Storage Assets ▪ Operate Pumping Systems ▪ Operate Emergency Power Supplies
	Shutdown & Outage Management Water Treatment Operators need to be able to manage plant shutdowns and the restarting processes. These can occur in planned, or unplanned, and emergency situations.	▪ Water Treatment Plant Isolation / Shutdown / Re-commissioning of Process Streams
	Fault & Incident Response Responding to failures and incidents in a systematic manner, including incident detection and identification, fault analysis, use of standard responses, temporary and permanent repairs is the responsibility of Water Treatment Operators. This includes the need to develop plans to respond to unplanned events and managing the resources required for the response to the events, and escalation criteria.	▪ Incident and Emergency Response Plans
	Asset Decommissioning and Disposal The processes used to decommission and dispose of assets due to aging or changes in performance and capacity requirements.	▪ Assist with the Implementation of the process of Decommissioning and Disposing of Assets
Asset Information	**Data and Information Management** Water Operators gather much of the data and information that is used in asset management data analysis or is supplied to regulators.	▪ Provide Data to Assist in Asset Management Decision Making ▪ Provide Data to Taumata Arowai – the Water Services Regulator
Risk & Review	**Risk Assessment and Management** Water Treatment Operators need to recognise, and be able to respond to, risks to the delivery of safe drinking water.	▪ Implementing Water Safety Plans ▪ Health and Safety ▪ Hazardous Substances Management ▪ Plant Security and Asset Protection ▪ Source Water Protection and Catchment Management Plans
	Asset Performance and Health Monitoring Water Treatment Operators need to understand how to monitor the performance of the assets that they are responsible for, how to report on asset performance and how to escalate problems they identify.	▪ Verification Monitoring ▪ Contaminants of Emerging Concern ▪ Resource Consent Compliance Monitoring
	Stakeholder Engagement Water Treatment Operators need to be able to communicate with the community and they also need to engage with other stakeholders like Drinking Water Assessors.	▪ Engage with Stakeholders and the Community

Wastewater Treatment Operator Profile

Wastewater Treatment Operators take a risk management approach to protect the health of the public. They fulfil a crucial role in ensuring that wastewater from New Zealand communities is treated and safely discharged back into the environment.

They need to have a full understanding of risk assessments and documented incident and emergency procedures that they are responsible for implementing.

To competently carry out their role Wastewater Treatment Operators need to understand wastewater treatment theories and principles to ensure that processes such as preliminary and biological treatment, are maintained, and the operation of these processes is monitored and controlled. When a fault occurs within a wastewater treatment plant, the Wastewater Treatment Operator finds the cause of the fault and ensures that it is resolved as quickly as possible

Wastewater Treatment Operator Elements of Competence

The table on the following page lists the elements of competence that are relevant to those roles that **Control Operations** and **Maintain Assets** in the context of operating and maintaining a Wastewater Treatment Plant.

Refer to the Water New Zealand Competency Framework: Wastewater Treatment Operator document where each element of competence is further drilled down into to give context in a Water Treatment environment, and to identify what it is a Wastewater Treatment operator needs to know and be able to do.

No one person at an organisation will be expected to be competent in all elements that this Framework details. The entire breadth of which knowledge and skills will be required by any operator will depend on the type of technology used by each Wastewater Treatment provider. It will also depend on the depth of experience held within the team that the operator works within; some of the elements of competence will be appropriate for senior operators in a managerial role with other elements appropriate for new entrants to the industry.

What does someone who operates and maintains a Wastewater Treatment Plant need to know and be able to do?

Water NZ Competency Framework Link & Context		Elements of Competence
Strategy & Planning	**Governance, Legislation and Regulatory Frameworks** Wastewater Treatment Operators are typically employed by Local Government either directly or via an outsourcing contract. They need an understanding of the governance, legal and regulatory frameworks that they are expected to operate within. Everybody involved in the wastewater industry also needs to understand the spiritual and cultural significance of water to Tangata Whenua.	▪ Governance, Legislation and Regulatory Frameworks ▪ The Role of resource consents ▪ Te Mana o te Wai
Asset Management Decision Making	**Operations and Maintenance Decision Making** Decisions made by Wastewater Treatment Operators must reflect and support the principles of treating and discharging wastewater in a manner that protects public health and the environment as well as the activities and processes involved in determining operations and maintenance requirements.	▪ The Principles of Wastewater Treatment ▪ Developing Site Management Plans ▪ Critical Control Points ▪ Operational Monitoring and Inspection for Process Control ▪ Apply a Knowledge of Science to Wastewater Treatment processes
Lifecycle Delivery	**Technical Standards** The activities that Wastewater Treatment Operators are responsible for must comply with relevant technical standards.	▪ Technical Standards related to Wastewater Treatment
	Maintenance Delivery Wastewater Treatment Operators need to be able to safely maintain the different types of equipment used in the delivery of wastewater treatment	▪ Safe Isolation of Plant and Equipment ▪ Hygiene Requirements ▪ Maintenance and Repairs of Wastewater Treatment Equipment ▪ Validation and Calibration of Monitoring Equipment ▪ Inventory Management ▪ Cranes and Lifting Equipment ▪ Maintaining Specified Building Systems
	Reliability Engineering & Root Cause Analysis Wastewater Treatment Operators need to be able to ensure that potential problems are identified as early as possible in an assets' life cycle, identifying the root cause of any lack of reliability	▪ Root Cause Analysis
	Asset Operations and Optimisation Wastewater Treatment Operators monitor, operate, control and optimise wastewater treatment assets to ensure they operate in a manner that meets their objectives, within appropriate design, maintenance and operational parameters.	▪ Wastewater Flows and Hydraulics ▪ Use Automated Systems to control Process Plant and Collect Data ▪ Operate Screening and Grit Removal Processes ▪ Operate Septage Receiving and Screening systems Processes ▪ Operate Primary Separation Processes ▪ Operate Fixed Growth Biological Treatment Processes ▪ Operate Suspended Growth Biological Treatment Processes ▪ Operate Waste Stabilisation Ponds ▪ Operate Aerated Lagoons ▪ Operate Anaerobic Digestion Processes ▪ Operate Sludge Handling and Dewatering Processes ▪ Operate Sludge Disposal ▪ Operate Tertiary Treatment Processes ▪ Operate Ventilation systems and Odour Control processes ▪ Operate Resource Recovery processes ▪ Operate Pumping Systems ▪ Manage Treated Effluent Discharges ▪ Operate Emergency Power Supplies
	Shutdown & Outage Management Wastewater Treatment Operators need to be able to manage plant shutdowns and the restarting processes. These can occur in planned, or unplanned, and emergency situations.	▪ Wastewater Treatment Plant Isolation / Shutdown / Re-commissioning of Process Streams
	Fault & Incident Response Responding to failures and incidents in a systematic manner, including incident detection and identification, fault analysis, use of standard responses, temporary and permanent repairs is the responsibility of Wastewater Treatment Operators. This includes the need to develop plans to respond to unplanned events and managing the resources required for the response to the events, and escalation criteria.	▪ Incident and Emergency Response Plans
	Asset Decommissioning and Disposal The processes used to decommission and dispose of assets due to aging or changes in performance and capacity requirements.	▪ Assisting with the Process to Decommission, Dispose or Abandon Assets
Asset Information	**Data and Information Management** Wastewater Operators gather much of the data and information that is used in asset management data analysis or is supplied to regulators.	▪ Provide Data to Assist in Asset Management Decision Making
Risk & Review	**Risk Assessment and Management** Wastewater Treatment Operators need to recognise, and be able to respond to, risks to the treatment and safe discharge of wastewater back into the environment.	▪ Implementing Site Management Plans ▪ Health and Safety ▪ Hazardous Substances Management ▪ Plant Security and Asset Protection ▪ Contaminants of Emerging Concern
	Asset Performance and Health Monitoring Wastewater Treatment Operators need to understand how to monitor the performance of the assets that they are responsible for, how to report on asset performance and how to escalate problems they identify.	▪ Verification Monitoring ▪ Resource Consent Compliance Monitoring
	Stakeholder Engagement Wastewater Treatment Operators need to be able to communicate with the community and they also need to engage with other stakeholders like Consent Compliance officers.	▪ Engage with Stakeholders and the Community

Drinking Water Distribution Operator Profile

Drinking Water Distribution Operators take a risk management approach to protect the health of the public. They fulfil a crucial role in ensuring that water Distribution networks, including pipes, service reservoirs and pump stations are operating properly to ensure that New Zealand communities are supplied with safe and sufficient water.

They need to have a full understanding of risk assessments and incident and emergency procedures that are documented within the Water Safety Plans that they are responsible for implementing.

To competently carry out their role Drinking Water Distribution Operators need to understand hydraulics, pressures and flows in a network in order to detect leakage. They need to have a full understanding of risk assessments and emergency procedures such as those identified in the Water Safety Plan. When a fault occurs, they find the root cause and utilise hydraulic theories and practices in order to ensure it is resolved as quickly and hygienically as possible. As water Distribution assets are typically located underground in the roading corridor they need to safely manage traffic, use asset locating equipment and excavation support.

Drinking Water Distribution Operator Elements of Competence

The table on the following page lists the elements of competence that are relevant to those roles that **Control Operations** and **Maintain Assets** in the context of operating and maintaining a water Distribution network.

Refer to the Water New Zealand Competency Framework: Water Distribution Operator document where each element of competence is further drilled down into to give context in a Water Treatment environment, and to identify what it is a Drinking Water Distribution operator needs to know and be able to do.

No one person at an organisation will be expected to be competent in all of the elements that this Framework details. The entire breadth of which knowledge and skills will be required by any operator will depend on the type of technology used by each Water Supplier. It will also depend on the depth of experience held within the team that the operator works within; some of the elements of competence will be appropriate for senior operators in a managerial role with other elements appropriate for new entrants to the industry.

What does someone who operates and maintains a Water Distribution Network need to know and be able to do?

Water NZ Competency Framework Link & Context		Elements of Competence
Strategy & Planning	**Governance, Legislation and Regulatory Frameworks** Drinking Water Distribution Operators are typically employed by Local Government either directly or via an outsourcing contract. They need an understanding of the governance, legal and regulatory frameworks that they are expected to operate within. Everybody involved in the water industry also needs to understand the spiritual and cultural significance of water to Tangata Whenua.	▪ Governance, Legislation and Regulatory Frameworks ▪ The Principles of Safe Drinking Water ▪ Development of Water Safety Plans ▪ The Role of the Drinking-water Standards for New Zealand ▪ Te Mana o te Wai
Asset Management Decision Making	**Operations and Maintenance Decision Making** Decisions made by Drinking Water Distribution Operators must reflect and support the principles of delivering safe drinking water as well as the activities and processes involved in determining operations and maintenance requirements.	▪ Critical Control Points ▪ Operational Monitoring and Inspection for Process Control ▪ Apply a Knowledge of Science to Water the Distribution Network
Lifecycle Delivery	**Technical Standards** The activities that Drinking Water Distribution Operators are responsible for must comply with relevant technical standards.	▪ Technical Standards related to Water Distribution Networks
	Maintenance Delivery Drinking Water Distribution Operators need to be able to safely maintain the different types of equipment used in the delivery of water treatment	▪ Safe Isolation of Plant and Equipment ▪ Drinking Water Hygiene and Residual Disinfection Requirements ▪ Locating Underground Services ▪ Safe Working in Roads ▪ Excavation Support ▪ Maintenance and Repairs of Water Distribution, Storage and Pumping Assets ▪ Validation and Calibration of Monitoring Equipment ▪ Inventory Management ▪ Cranes and Lifting Equipment
	Reliability Engineering & Root Cause Analysis Drinking Water Distribution Operators need to be able to ensure that potential problems are identified as early as possible in an assets' life cycle, identifying the root cause of any lack of reliability	▪ Root Cause Analysis
	Asset Operations and Optimisation Drinking Water Distribution Operators monitor, operate, control and optimise water treatment assets to ensure they operate in a manner that meets their objectives, within appropriate design, maintenance and operational parameters.	▪ Water Demand and Hydraulics ▪ Backflow Prevention ▪ Water Metering ▪ Valve and Hydrant Operations ▪ Pressure Management ▪ Network Performance Monitoring and Leakage Detection ▪ Use Automated Systems to Control Process Plant and Collect Data ▪ Operate Water Storage Assets ▪ Operate Pumping Systems ▪ Operate Emergency Power supplies
	Shutdown & Outage Management Drinking Water Distribution Operators need to be able to manage plant shutdowns and the restarting processes. These can occur in planned, or unplanned, and emergency situations.	▪ Distribution, Pumping and Water Storage Asset Isolation / Shutdown / Re-commissioning ▪ Vulnerable Persons Notification
	Fault & Incident Response Responding to failures and incidents in a systematic manner, including incident detection and identification, fault analysis, use of standard responses, temporary and permanent repairs is the responsibility of Drinking Water Distribution Operators. This includes the need to develop plans to respond to unplanned events and managing the resources required for the response to the events, and escalation criteria.	▪ Incident and Emergency Response Plans
	Asset Decommissioning and Disposal The processes used to decommission and dispose of assets due to aging or changes in performance and capacity requirements.	▪ Assisting with the Process to Decommission, Dispose or Abandon Assets
Asset Information	**Data and Information Management** Drinking Water Distribution Operators gather much of the data and information that is used in asset management data analysis or is supplied to regulators.	▪ Provide Data to Assist in Asset Management Decision Making ▪ Provide Data to Taumata Arowai – the Water Services Regulator
Risk & Review	**Risk Assessment and Management** Drinking Water Distribution Operators need to recognise, and be able to respond to, risks to the delivery of safe drinking water.	▪ Implementing Water Safety Plans ▪ Health and Safety ▪ Hazardous Substances Management ▪ Working with Asbestos ▪ Asset Security and Protection
	Asset Performance and Health Monitoring Drinking Water Distribution Operators need to understand how to monitor the performance of the assets that they are responsible for, how to report on asset performance and how to escalate problems they identify.	▪ Verification Monitoring ▪ Resource Consent Compliance Monitoring
	Stakeholder Engagement Drinking Water Distribution Operators need to be able to communicate with the community and they also need to engage with other stakeholders like Drinking Water Assessors.	▪ Engage with Stakeholders and the Community

Wastewater Network Operator Profile

Wastewater Network Operators take a risk management approach to protect the health of the public. They fulfil a crucial role in ensuring that wastewater networks, including pipelines and pump stations, are running properly, so that wastewater is safely conveyed to the Wastewater Treatment Plant for treatment and disposal.

They need to have a full understanding of risk assessments and documented incident and emergency procedures that they are responsible for implementing.

To competently carry out their role Wastewater Network Operators need to be able to respond to incidents like reports of blockages and overflows, find the cause of the fault and makes sure that it is resolved as quickly as possible. To do this they need to able to work in confined spaces and have a full understanding of risk assessments and emergency procedures. They also need to be able to carry out, or supervise, maintenance activities such as pump maintenance, high pressure water jetting, flushing and de-silting operations. As wastewater network assets are typically located underground within the roading corridor they need to be able to safely manage traffic, use asset locating equipment and excavation support.

Wastewater Network Operator Elements of Competence

The table on the following page lists the elements of competence that are relevant to those roles that **Control Operations** and **Maintain Assets** in the context of operating and maintaining a Wastewater Collection Network.

Refer to the Water New Zealand Competency Framework: Wastewater Network Operator document where each element of competence is further drilled down into to give context in a Water Treatment environment, and to identify what it is a Wastewater Network operator needs to know and be able to do.

No one person at an organisation will be expected to be competent in all of the elements that this Framework details. The entire breadth of which knowledge and skills will be required by any operator will depend on the type of technology used by each Wastewater Treatment provider. It will also depend on the depth of experience held within the team that the operator works within; some of the elements of competence will be appropriate for senior operators in a managerial role with other elements appropriate for new entrants to the industry.

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What does someone who operates and maintains a Wastewater Network need to know and be able to do?

	Water NZ Competency Framework Link & Context	Elements of Competence
Strategy & Planning	**Governance, Legislation and Regulatory Frameworks** Wastewater Network Operators are typically employed by Local Government either directly or via an outsourcing contract. They need an understanding of the governance, legal and regulatory frameworks that they are expected to operate within. Everybody involved in the wastewater industry also needs to understand the spiritual and cultural significance of water to Tangata Whenua.	▪ Governance, Legislation and Regulatory Frameworks ▪ The Role of Resource Consents ▪ Te Mana o te Wai
Asset Management Decision Making	**Operations and Maintenance Decision Making** Decisions made by Wastewater Network Operators must reflect and support the principles of protecting public health and the environment as well as the activities and processes involved in determining operations and maintenance requirements.	▪ Critical Control Points ▪ Operational Monitoring and Inspection for Process Control ▪ Apply a Knowledge of Science to Wastewater Collection Network Processes
Lifecycle Delivery	**Technical Standards** The activities that Wastewater Network Operators are responsible for must comply with relevant technical standards.	▪ Technical Standards related to Wastewater Collection Networks
	Maintenance Delivery Wastewater Network Operators need to be able to safely maintain the different types of equipment used in the delivery of wastewater collection networks	▪ Safe Isolation of Plant and Equipment ▪ Hygiene Requirements ▪ Maintenance and repairs of Wastewater Network assets ▪ Validation and Calibration of Monitoring Equipment ▪ Inventory Management ▪ Cranes and Lifting Equipment
	Reliability Engineering & Root Cause Analysis Wastewater Network Operators need to be able to ensure that potential problems are identified as early as possible in an assets' life cycle, identifying the root cause of any lack of reliability	▪ Root Cause Analysis
	Asset Operations and Optimisation Wastewater Network Operators monitor, operate, control and optimise wastewater collection network assets to ensure they operate in a manner that meets their objectives, within appropriate design, maintenance and operational parameters.	▪ Wastewater Flows and Hydraulics ▪ Use Automated Systems to Control the Process Plant and Collect Data ▪ Operate Pumping Systems ▪ Operate Emergency Power Supplies ▪ Operate Ventilation Systems ▪ Operate Odour Control Processes ▪ CCTV Operations and Remedial Actions ▪ Water Jetting Operations ▪ Trade Effluent Measurement and Monitoring ▪ Fat, Oil and Grease Procedures ▪ Organise Network Operations ▪ Operate Pressure and Vacuum Sewers
	Shutdown & Outage Management Wastewater Network Operators need to be able to manage network shutdowns and the restarting processes. These can occur in planned, or unplanned, and emergency situations.	▪ Wastewater Treatment Plant Isolation / Shutdown / Re-commissioning of Process Streams ▪ Environmental Clean-up of Overflows
	Fault & Incident Response Responding to failures and incidents in a systematic manner, including incident detection and identification, fault analysis, use of standard responses, temporary and permanent repairs is the responsibility of Wastewater Treatment Operators. This includes the need to develop plans to respond to unplanned events and managing the resources required for the response to the events, and escalation criteria.	▪ Incident and Emergency Response Plans
	Asset Decommissioning and Disposal The processes used to decommission and dispose of assets due to aging or changes in performance and capacity requirements.	▪ Assisting with the Process to Decommission, Dispose or Abandon Assets
Asset Information	**Data and Information Management** Wastewater Network Operators gather much of the data and information that is used in asset management data analysis or is supplied to regulators.	▪ Provide Data to Assist in Asset Management Decision Making
Risk & Review	**Risk Assessment and Management** Wastewater Network Operators need to recognise, and be able to respond to, risks to the safe conveyance of wastewater.	▪ Implementing Site Management Plans ▪ Health and Safety ▪ Hazardous Substances Management ▪ Plant Security and Asset Protection ▪ Protection of the Discharge environment ▪ Contaminants of Emerging Concern
	Asset Performance and Health Monitoring Wastewater Network Operators need to understand how to monitor the performance of the assets that they are responsible for, how to report on asset performance and how to escalate problems they identify.	▪ Verification Monitoring ▪ Resource Consent Compliance Monitoring ▪ Inflow and Infiltration
	Stakeholder Engagement Wastewater Network Operators need to be able to communicate with the community and they also need to engage with other stakeholders like Consent Compliance officers.	▪ Engage with Stakeholders and the Community

References

[1] The Institute of Asset Management, The IAM Competences Framework. Part 1: Asset Management Competence Requirements Framework, www.theiam.org.uk, 2014.

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[3] International Organization for Standardization (ISO), "ISO 55000 - Asset Management - Overview, Principles and Terminology," 2014.

[4] International Organization for Standardization (ISO), "ISO 55001 - Asset Management - Management Systems - Requirements".

[5] International Organization for Standardization (ISO), "ISO 55002 - Asset Management - Management Systems - Guidelines for the application of ISO 55001".

[6] Department of Internal Affairs, "https://www.dia.govt.nz/Three-Waters-Review," [Online].