Organisational Requirements

for infrastructure delivery

No. OR

Ver.1

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0.1	First draft for internal comment	J de Villiers	14/09/2020
1	First release	J de Villiers	20/10/2020

Summary of changes

Version	Section	Description of revision
1		Updates from comments on first draft

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Definitions

Assets	Water and wastewater infrastructure and related equipment and components owned and operated by Watercare.
Competent person	A person who is qualified because of a specific knowledge, training and applicable experience that is familiar with the Health and Safety at Work Act and conversant in identifying and taking corrective action to potential dangers in the workplace.
Controlling authority	Person(s) in a position of responsibility that is authorised to decide on changes, provide access and provide direction.
Hazard	Potential source of harm.
Infrastructure	Facilities in an operational capacity that is managed by a controlling authority.
Risk	Combination of the probability of the harm caused by a hazard and the impact or severity that may result.
Utility	A public agency, organisation or entity that is licensed to operate and maintain infrastructure for a public service.

1. Introduction

1.1 Purpose and Scope

This document provides the backdrop of Watercare's obligations and structure around infrastructure delivery and applies to all works delivered by, or vested to, Watercare. This document is to inform on our high-level drivers from legislation to policies, the structure of our standards to cover the delivery of new assets and the handling of information related to new infrastructure. This is to contribute to the creation of project requirements to ensure that the foundations of good infrastructure are attained, and value is extracted over the life of the infrastructure.

2. Delivering infrastructure to meet Watercare's obligations

This section sets out the framework under which Watercare operates and therefore requires designers and contractors to follow.

2.1 Watercare's organisational status

As a council controlled organisation, Watercare is treated as if it's a local authority and must give effect to the Auckland Council long term plan.

2.2 Watercare's obligations under the local Government Act 2009

Watercare must:

- Manage operations efficiently, keeping overall cost at minimum with undertakings maintaining long-term asset integrity.
- Not pay dividends or distribute surplus.
- Have regard for public safety in relation to our structures and operations.

2.3 Offences and liabilities

a) Watercare is liable and exposed to penalties on operational and construction deficiencies.
b) Watercare may hold liabilities and penalties on external parties for offences.

2.4 Nuisances

Our operations and infrastructure may not cause certain nuisances under the Health Act such as odour and noise.

3. Outcomes to be delivered

Watercare requirements are to achieve several performance outcomes:

- Health and Safety of our customers and people
- Legislative compliance
- Compliance with New Zealand standards
- Follow international best practice
- Customer satisfaction
- Watercare strategic alignment
- Sound financial and asset management
- Reliability

Designs and construction works are subject to the latest revisions to statues, regulations and bylaws including but not limited to:

- Building Act 2004, Building Regulations, and New Zealand Building Code (NZBC) 1992
- Civil Defence Emergency Management Act 2002

- Conservation Act 1987
- Government Roading Powers Act 1989
- Health and Safety at Work act 2015
- Health (Drinking Water) Amendment Act 2007
- Historic Places Act 1993
- Infrastructure (Amendments Relating to Utilities Access) Act 2010
- Land Transfer Act 1952
- Local Government Act 1974 and Local Government Act 2002, and related by-laws
- Reserves Act 1977
- Resource Management Act 1991, including all applicable regional and territorial planning documents
- Local Government (Auckland Council) Act 2009
- Local Government (Auckland Transitional Provisions) Act 2010
- Utilities Access Act 2010, National Code of Practice for Utility Operators' Access to Transport Corridors

4. Carbon footprint reduction and value engineering

The infrastructure owned and operated by Watercare has a large influence on new projects, renewals and ongoing maintenance. Watercare has a 40/20/20 directive under which all new infrastructure is to be created. This initiative is to reduce carbon emission by 40% by the year 2024 and achieve net zero by 2050, reduce capital expenditure by 20% and improve on health and safety by 20% year-on-year. To support this policy, all new infrastructure should demonstrate opportunities by:

- System selection and layout
- Low carbon infrastructure delivery over the complete lifecycle of the asset
- Initiatives in design and construction
- Product selection
- Energy efficiencies
- Carbon removals
- Re-use

5. Understanding the impact of a changing environment

To address the impact of a changing environment on new infrastructure, the infrastructure solution must demonstrate the measures taken to address the impact by:

- The considerations of various scenarios to determine the key financial, operational and environmental performance indicators.
- Compare adaptation measures and allow prioritisation.
- The location of infrastructure and the impact of flooding on infiltration and overflows, or drought.
- Addressing water level rise and possible need for asset relocation, floatation of assets, saltwater intrusion and submerged outfalls.
- Mitigating energy costs such as for pump stations.

6. Quality design and construction

Design and construction works should follow our codes, principles and standards. By following these documents, we can measure the outcomes against our objectives. Departures should be highlighted to ensure we can find solutions to achieve our obligations. Departures may be rejected even if the infrastructure delivery costs may be reduced. All our performance outcomes must be met in such assessments.

Watercare may consider alternative designs and design methods, or construction methods provided that the performance outcomes that Watercare requires is proven to be adequately addressed. Whole-of-life costing and Health and Safety are important parts of this evaluation to meet our obligations under the Local Government Act.

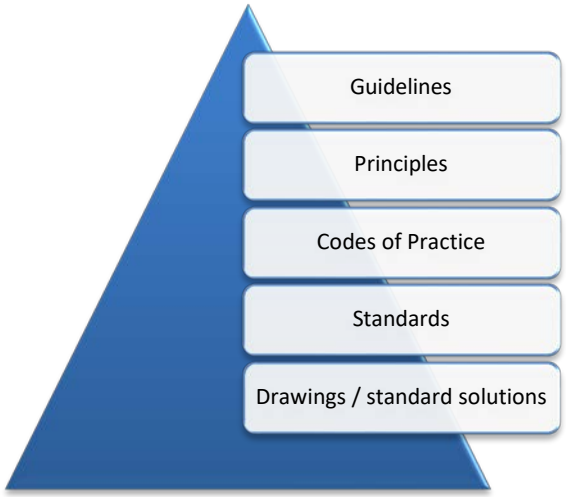
7. Quality products

Watercare standards lists several accepted and standardised products. Compliance is evaluated against local and industry standards as well as Watercare specific requirements. Our requirements are based off experience and in support of our outcomes approach, especially maintenance and replacement costs. Alternative products may be considered but will be evaluated against these same requirements.

8. Watercare's engineering standards framework

To meet legal compliances and achieve Watercare strategies and policies, the engineering standards framework is an arrangement of our technical outcomes under a structure for each operational area: Networks, Transmission, Electrical and control, and Process Plants.

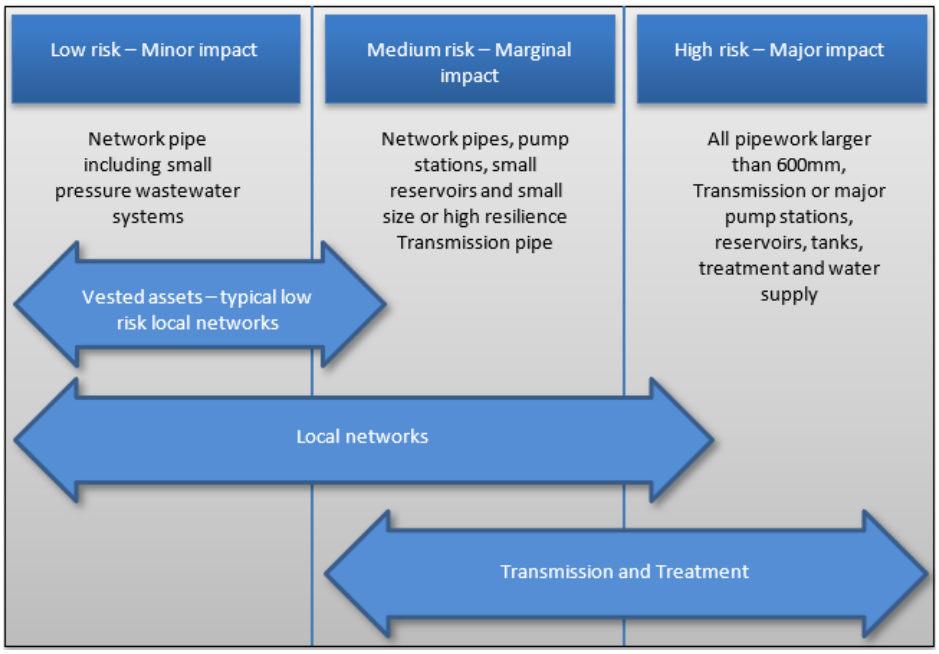
Documents held in the standards framework follow a hierarchy.



- Guidelines provide options to enact the outcomes sought by policies and strategies
- Principles are the certainties which theories and practices are based on
- Codes of Practices are the accepted method or practice derived from first principles and best practice
- A standard is a required method that is accepted as the norm to provide a desired outcome
- Drawing/standard solutions are acceptable solutions typical of the standards and codes

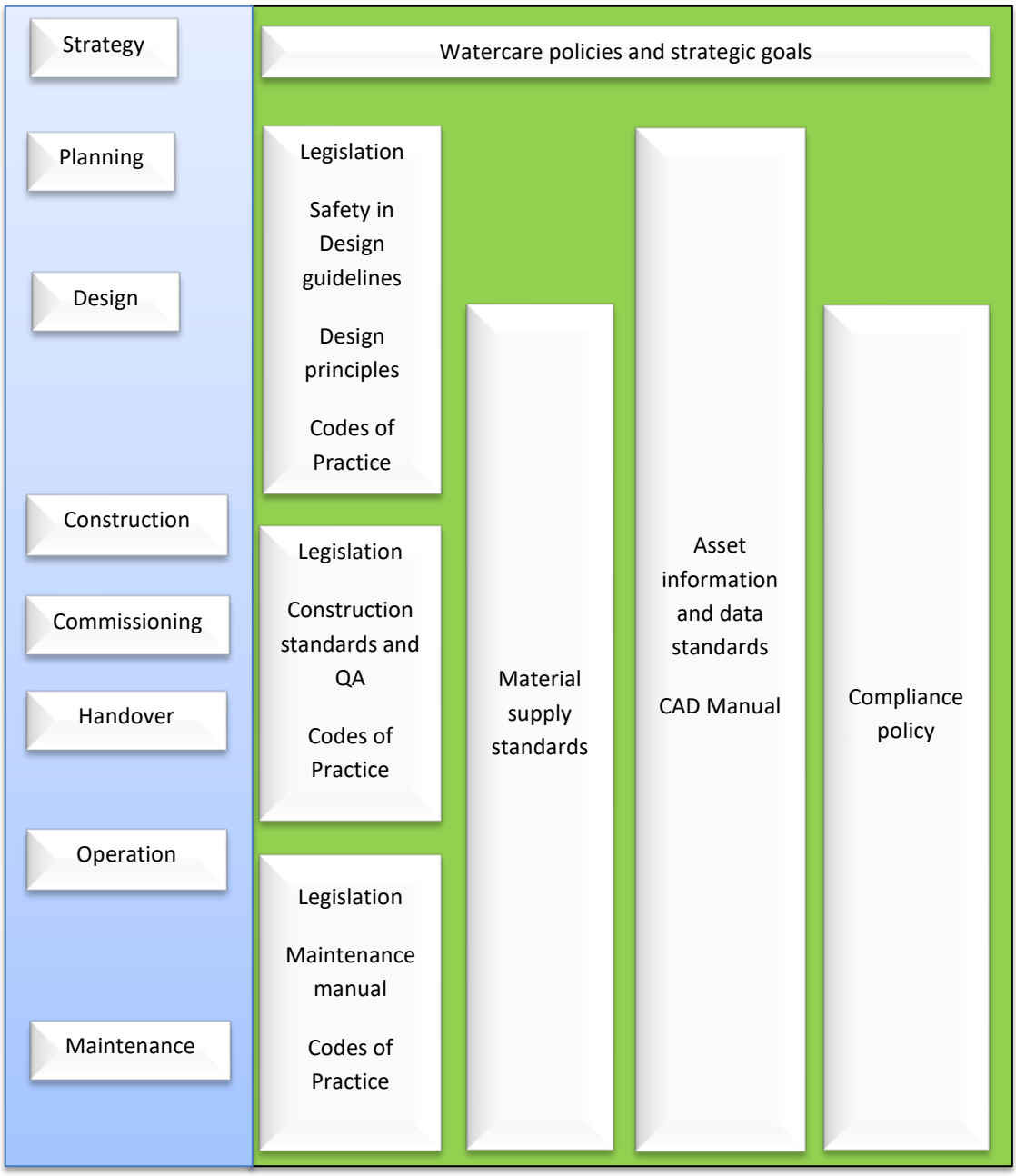
This document hierarchy is applied to the various parts of our infrastructure based on importance and criticality of the asset function, as well as the risk involved in accurately achieving the infrastructure outcome that Watercare seek.

Watercare needs to consider the impact of failure on loss of service, compliance with regulations, consents and health and safety of people for all assets in its installed environment when agreeing to an infrastructure solution. Complexity, sustainability and resilience of the infrastructure is also considered to achieve the correct level of innovation whilst not compromising our obligations under the local government act and other legislation. Complexity and risk is loosely demonstrated by the below diagram:



8.1 Applying the Watercare standards framework

The following diagram depicts when the various document types in the engineering standards are to be applied during the typical phases of infrastructure delivery:



8.2 Nesting of standards

Based on the document hierarchy some specifically nested standards are shown in the following diagrams:

Figure 1: Linear local network infrastructure document hierarchy

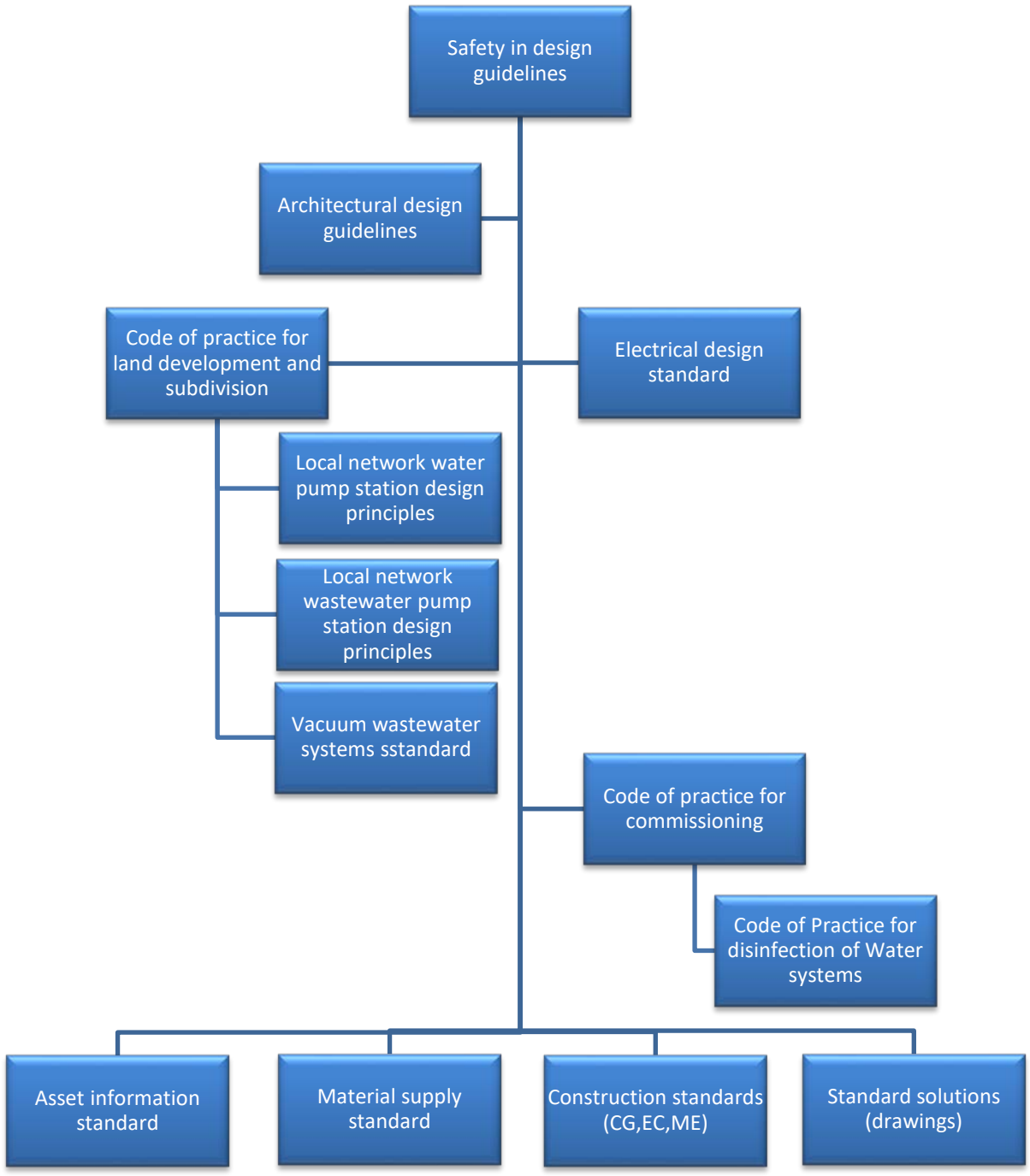


Figure 2: Transmission network infrastructure document hierarchy

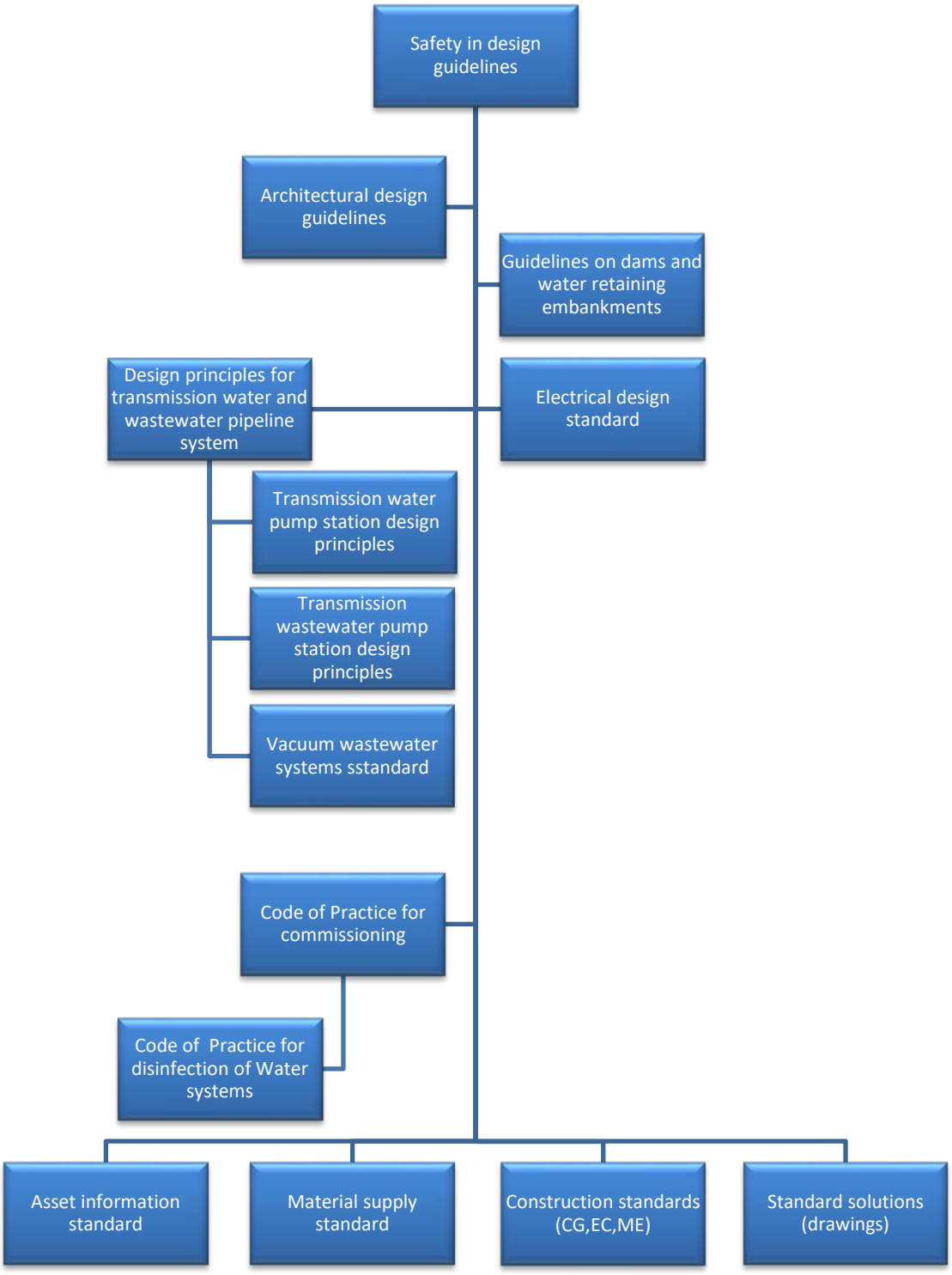
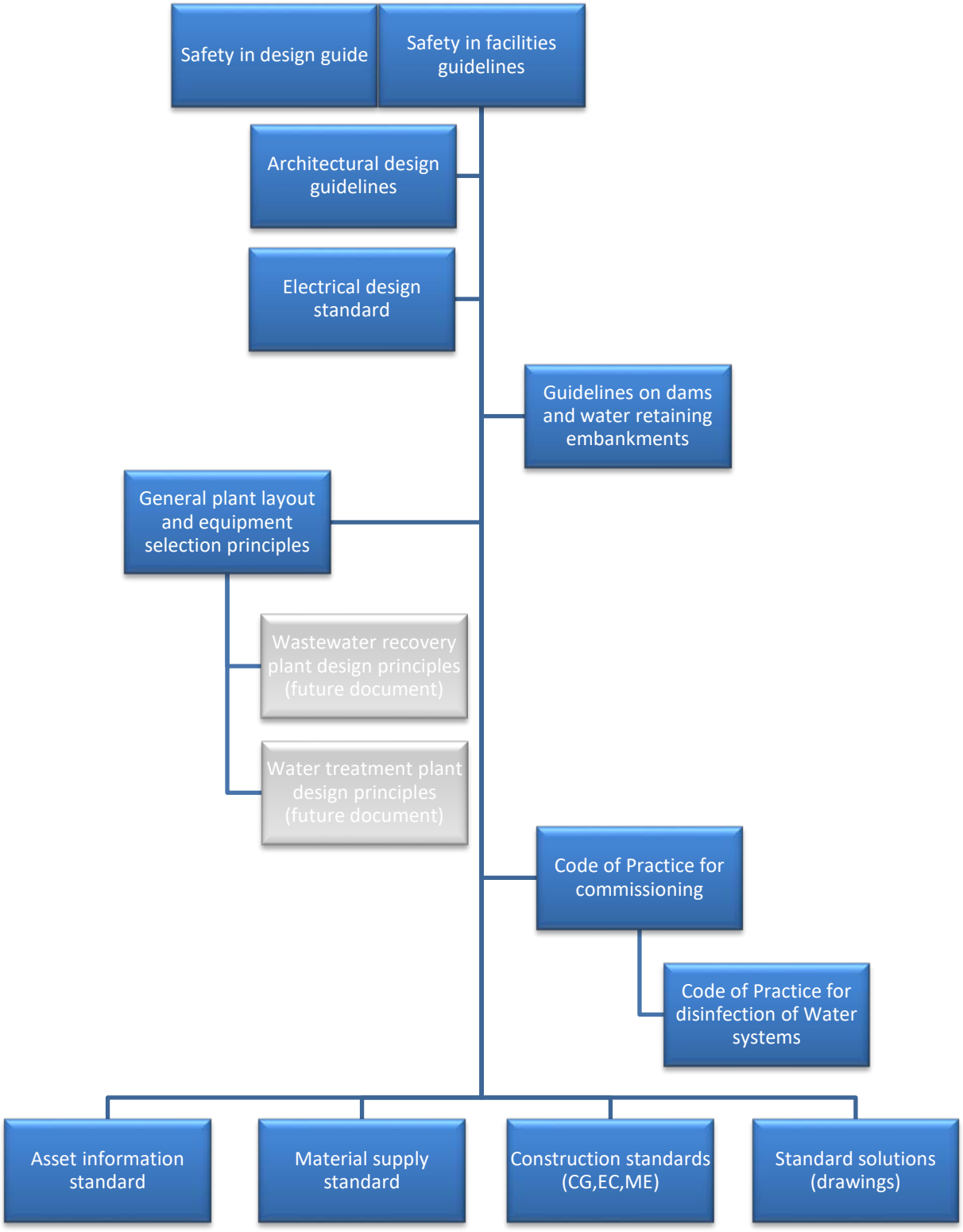


Figure 3: Process plant infrastructure document hierarchy



9. Competency

The infrastructure must be delivered by a person or persons with evaluated competency in accordance with the Watercare compliance policy.

10. General deliverables

The infrastructure is delivered to meet our outcomes and to be demonstrated as described by the Watercare compliance policy. The policy requires designers and contractors to provide evidence-based design and works delivery.

The below prompt list could be useful to keep track of the various aspects to consider when delivering infrastructure:

	Y / NA
DESIGN SOLUTION OPTION	
Fit for purpose	
Best solution including resilience and sustainability analysis	
Operating functions satisfied	
Clearance for other services or future expansion	
GROUND INVESTIGATION	
Geotechnical investigation	
Soil contamination tests	
Topographical consideration	
HYDRAULIC DESIGN	
Flow velocity and capacity	
Water hammer	
Minimise pressure / pressure management	
Minimise friction/energy losses	
Air release and vacuum control	
Pipe grade	
PROCESS DESIGN	
HAZOP results satisfied	
P & ID signed off	
Control philosophy agreed	
Flow, density, temperature, pressure – control, measurement and monitoring	
Service infrastructure, power, water, air, storm drainage and waste management	
Solids concentration	
Tonnage rates	
STRUCTURAL DESIGN	
Stability, strength and fatigue	
Effect on existing structures, etc.	
Environmental: wind, rain, subsidence, flooding and fire	
Marine growth, scour	
Loadings: dead, live, temporary, permanent	
Construction load	

	Y / NA
Transportation load	
Installation, lifting load	
Stability, strength and fatigue	
Earthquake, dynamic analysis	
Vortex induced vibration	
ENVIRONMENTAL ISSUES	
Carbon footprint reduction	
Resource Consents	
Permitted activities	
Compliance with imposed conditions	
Authority under the Historic Places Act	
EQUIPMENT DESIGN	
Type, location, clearances and layout	
Reliability, operability and maintainability	
Regulatory requirements	
Electrical items, cable trays and cabinets	
Standardisation with existing equipment	
Suitability for purpose	
Equipment handling and protection	
CONSTRUCTION	
Material type and availability	
Method/special techniques	
Works schedule	
Tie-ins/shut-downs	
Design satisfies fabrication, installation methods	
Access requirements	
Ease of fabrication	
Temporary installation aids	
Equipment suitable for installation	
Corrosion protection	
OPERATION	
Future expansion	
Operating procedures for normal, abnormal and emergency conditions	
Mobile equipment requirements	
Housekeeping	
MAINTENANCE	
Access	
Lighting	
Spares and its storage	
Methods of maintaining	
Lifting facilities	
Serviceability	
DOCUMENTATION	
Equipment numbering	

	Y / NA
Documentation delivery through stages or on demand	
Drawing and model delivery	
QA/QS documentation and other records of installation	
Project and construction implementation plans	
Manuals, standard operating procedures and functional descriptions	
Asset recording with completed attributes	

11. Information management

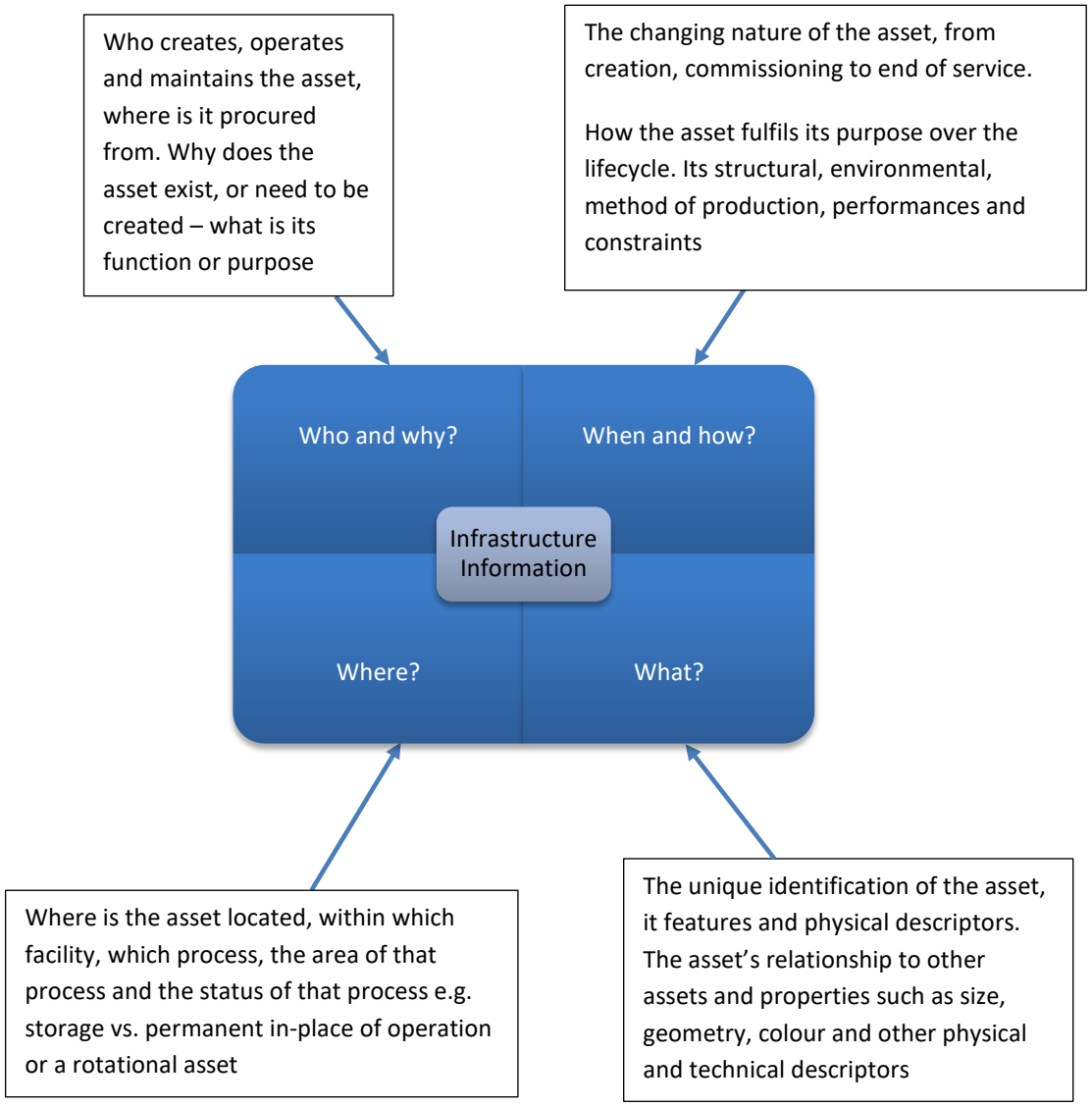
The digital delivery of information on new infrastructure is increasingly being used to produce greater value and unlocking productivity, sustainability and operational excellence. This benefits our customers when we can make better, faster and more informed decisions.

We therefore need to leverage maximum value throughout the life of the asset and to achieve that is to produce a digital twin of all our infrastructure.

By creating digital twins, we seek to extract value over the life of the asset but believe that this technology also procures several benefits throughout design and construction and will help Watercare to lower carbon and extract costs efficiencies through the construction process. All this helps towards meeting the Watercare 40/20/20 targets and create a more agile future for our infrastructure.

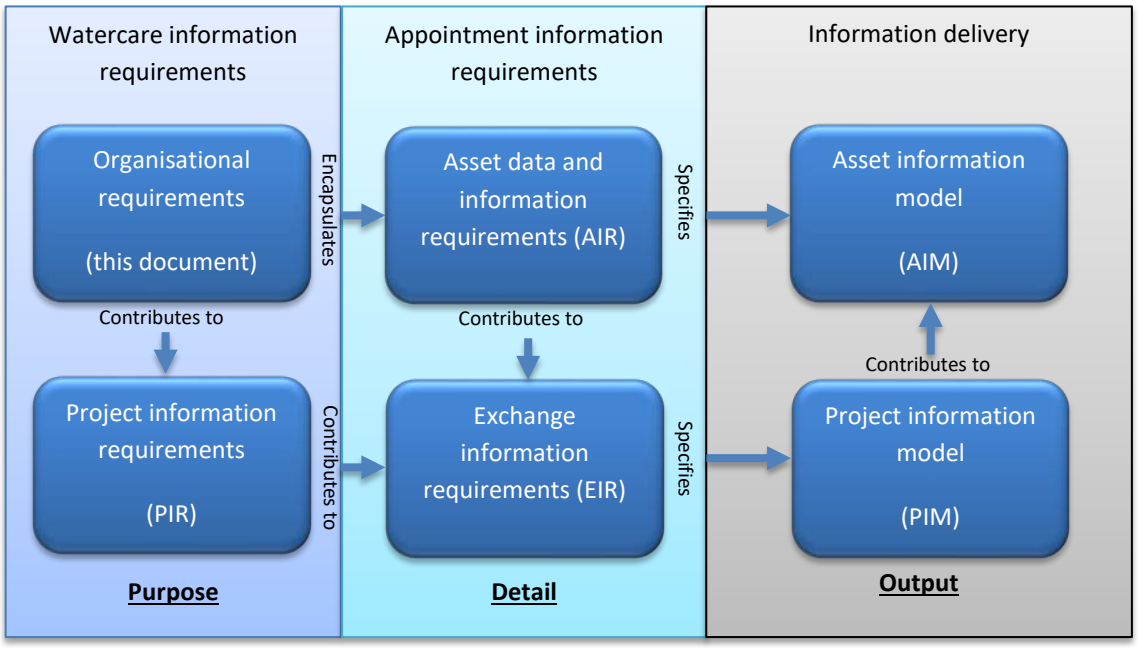
11.1 Fundamentals of information

The fundamentals of infrastructure information are demonstrated by the below graphic:



Information throughout asset delivery should follow the processes set out by ISO19650. This process allows data and information on the new infrastructure to be collected in a complete and consistent manner in concurrence with the physical asset delivery.

The below diagram from ISO 19650 demonstrates the related documentation to inform the outcomes of information delivery:



The outputs Watercare seek to leverage are:

- Visualise and test the form and function of the new infrastructure before design is finalised
- Make sure it is safe
- Visualise production activities for establishing methods, parts and schedules
- Train new staff and customer service representatives
- Unlocking time, work sequence and cost management during construction
- Effectively manage ongoing and future changes
- Ultimately federate our whole system to enhance our operations

11.2 The common data environment (CDE)

There are three established models:

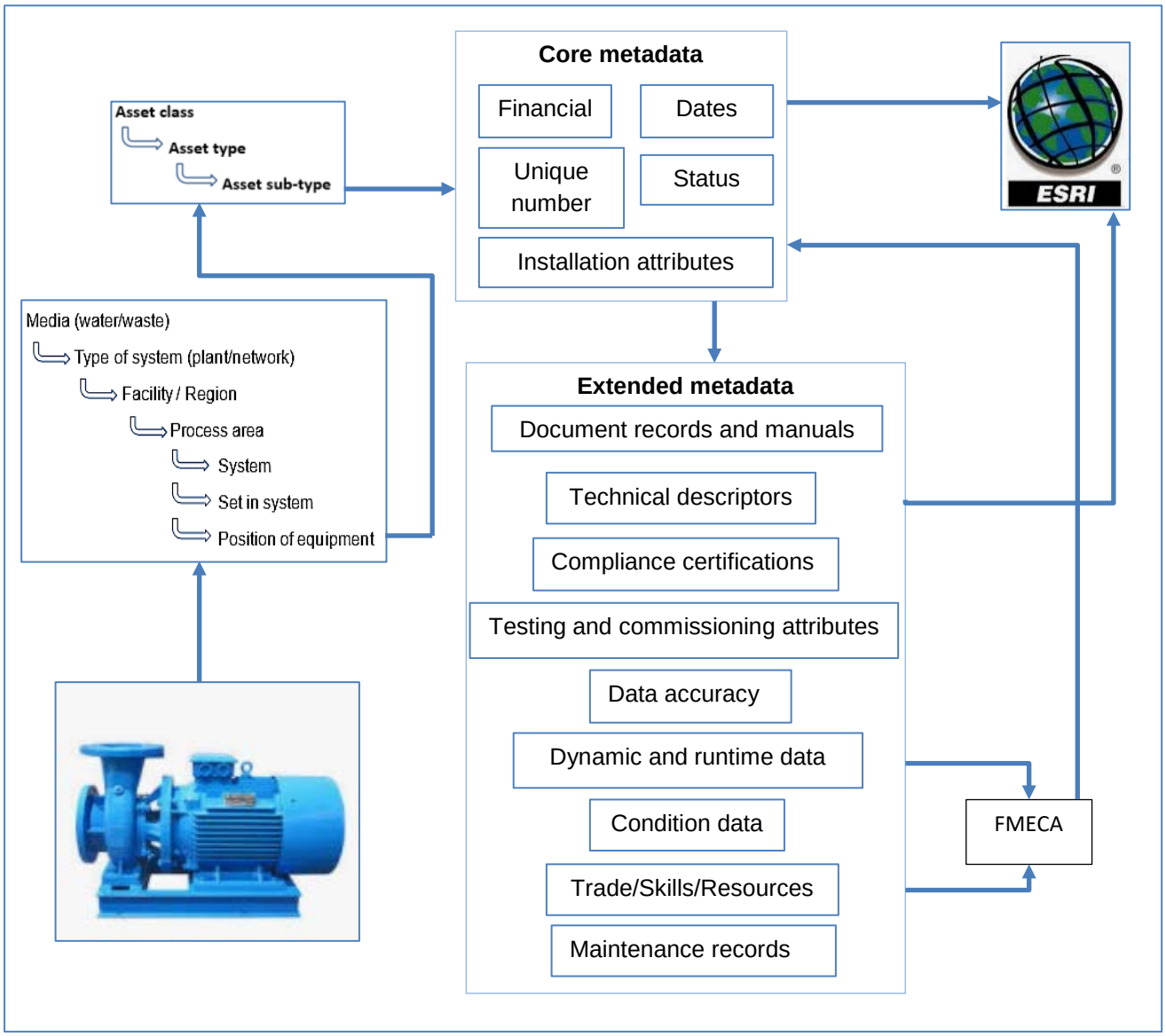
- Model 1 - Supplier-led: In this instance the appointed party will establish the CDE.
- Model 2 – Joint Client-Supplier (Hybrid) setup where the appointed party follows an established workflow in their own CDE to transfer data to the Watercare CDE depending on the contractual agreement.
- Model 3 – Client-led: Watercare provides the CDE for the end-to-end information lifecycle. All work is developed, shared and published within the Watercare systems.

Model 1 is followed for developer works due to the established vestment processes. The developer must setup their own templates and ensure data is transferred complete to the Watercare requirements. This is typically less complex and mostly linear works.

All other infrastructure delivery will follow Model 3 unless otherwise agreed.

11.3 Information structure

Information needs to be structured to meet the layout of Watercare's data structures as shown below:



12. Organisation structure

The organisational structure is provided for information and understanding of the various points of contact: